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COMMISSION STAFF WORKING DOCUMENT

First Flood Risk Management Plans - Member State: United Kingdom

Accompanying the document

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

on the implementation of the Water Framework Directive (2000/60/EC) and the Floods Directive (2007/60/EC) Second River Basin Management Plans First Flood Risk Management Plans

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Acronyms

APSFR	Areas of Potential Significant Flood Risk
CBA	Cost-benefit analysis
EEA	European Environment Agency
FD	Floods Directive
FHRM	Flood Hazard and Risk Map
FRMP	Flood Risk Management Plan
KTM	Key Type of Measures
NGO	Non-Governmental Organisation
NWRM	Natural Water Retention Measures
PFRA	Preliminary Flood Risk Assessments
RBD	River Basin District
RBMP	River Basin Management Plan
UoM	Unit of Management
WFD	Water Framework Directive
WISE	Water Information System for Europe

Introduction

The Floods Directive (FD) (2007/60/EC) requires each Member State to assess its territory for significant risk from flooding, to map the flood extent, identify the potential adverse consequences of future floods for human health, the environment, cultural heritage and economic activity in these areas, and to take adequate and coordinated measures to reduce this flood risk. By the end of 2011, Member States were to prepare Preliminary Flood Risk Assessments (PFRAs) to identify the river basins and coastal areas at risk of flooding (Areas of Potential Significant Flood Risk – APSFRs). By the end of 2013, Flood Hazard & Risk Maps (FHRMs) were to be drawn up for such areas. On this basis, Member States were to prepare Flood Risk Management Strategies assessed by the end of 2015.

This report assesses the Flood Risk Management Plans (FRMPs) for the United Kingdom¹. Its structure follows a common assessment template used for all Member States. The report draws on two main sources:

- Member State reporting to the European Commission on the FRMPs² as per Articles 7 and 15 of the FD: this reporting provides an overview of the plans and details on their measures.
- Selected FRMPs: due to the high number of FRMPs prepared in the UK (36 in total), the assessment has focused on a selected set of plans/strategies, chosen to cover a range of methodological approaches, the UK's administrative structure and different Units of Management (UoMs). The following FRMPs were reviewed in England, Northern Ireland and Wales, where the plans assessed were prepared at the level of the UoMs:
 - UK02 Solway Tweed (English part of the UoM);
 - UK09 Severn (jointly managed by England and Wales);
 - UKGBNIIENB Neagh Bann (Northern Ireland).

In Scotland, where Flood Risk Management Strategies were prepared at a sub-UoM level, the following strategies (as opposed to plans) were assessed out of a total of 14 FRM Strategies (which 14 are included in the total of 36):

- UK01 Clyde and Loch Lomond (Scottish part of the UoM);
- UK02 Solway (Scottish part of the UoM);

¹ The present Member State assessment reports reflect the situation as reported by each Member State to the Commission in 2016 or 2017 and with reference to FRMPs prepared earlier. The situation in the Member States may have altered since then.

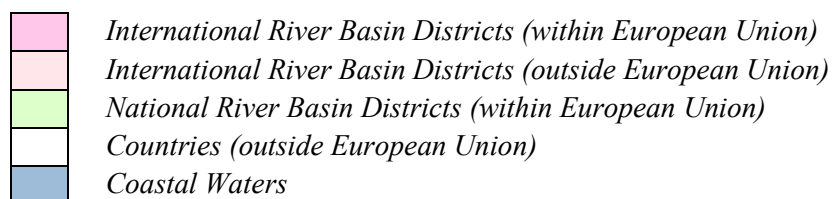
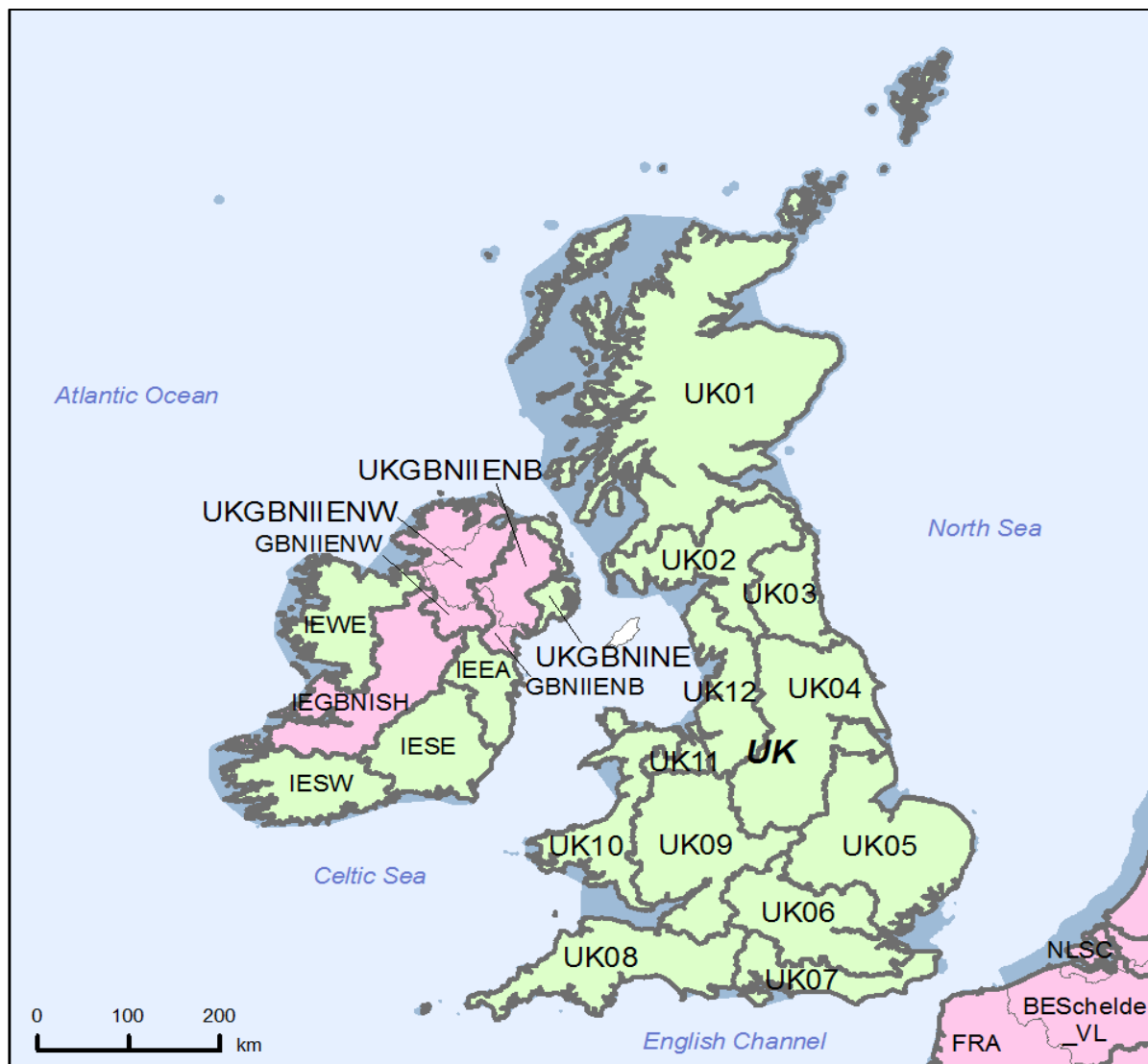
² Referred to as “Reporting Sheets” throughout this report. Data must be reported in a clear and consistent way by all Member States. The format for reporting was jointly elaborated by the Member States and the Commission as part of a collaborative process called the “Common Implementation Strategy”:

http://ec.europa.eu/environment/water/water-framework/objectives/implementation_en.htm

Whereas a key role of the Commission is to check compliance with EU legislation, the Commission also seeks information to allow it to determine whether existing policies are adequate. It also requires certain information to create a European-wide picture to inform the public.

Overview

Figure 1 *Map of Units of Management/River Basin Districts*



Source: WISE, Eurostat (country borders) as presented in the 2012 River Basins Management Plan assessment reports

The UK is divided into 16 UoMs. For England, Wales and Northern Ireland these correspond to the River Basin Districts (RBDs) under the Water Framework Directive (WFD) and each has an FRMP.

At the time of the assessment, the UK had reported a total of 36 FRMPs (no FRMP has been reported for Gibraltar³, UKGI17). In England, Wales and Northern Ireland, the FRMPs are prepared at UoM level. Wales also prepared an additional 8 FRMPs at the level of the Lead Local Flood Authorities (LLFA). In Scotland, 14 Flood Risk Management Strategies (FRMSs) were prepared by Local Plan Districts, which relate to river catchments as well as to administrative areas. These Strategies were reported to Water Information System for Europe (WISE) as Flood Risk Management Strategies assessed and are included in the assessment^{4, 5}.

Two of the Scottish Local Plan Districts are within the Solway Tweed UoM (UK02) that is shared and jointly managed with England. One FRMP was prepared for the area of the UoM in England and two strategies for the two Local Plan Districts in Scotland. Two UoMs are located in both England and Wales (UK11 – Dee and UK09 – Severn): these UoMs are jointly managed and a single FRMP was prepared for each UoM.

The approaches for the FRMPs differ between Scotland, Northern Ireland, and England and Wales). However, the approach within each of these four jurisdictions is the same, for example the same wording is used within the introductory chapters of the FRMPs. In England the competent authority for the FD is the Environment Agency⁶; in Wales, Natural Resources Wales (NRW); in Northern Ireland, the Northern Ireland Department of Agriculture and Rural Development (DARD); and in Scotland, the Scottish Environment Protection Agency (SEPA)⁷.

The Scottish FRMSs were published by the Scottish Environmental Protection Agency (SEPA) and indicate that they were approved by Scottish Ministers. Information on the approval of English, Welsh and Northern Irish FRMPs was not found.

The table below gives an overview of all UoMs in the UK, including the UoM code, the name, and the number of APSFRs reported. It also shows if the UK reported all documents for each UoM to the European Environment Agency's (EEA) WISE⁸ – the FRMP(s) as a PDF and the reporting sheet as an XML.

³ No APSFRs are reported in Gibraltar and, consequently, an FRMP is not required. The UK did, however, prepare FRMPs for other UoMs without APSFRs: UK03 (Northumbria), UK08 (South west) and UK11 (Dee).

⁴ The Local Plan Districts in Scotland also prepared local "Flood Risk Management Plans", which provide further detail. The UK, however, did not report these Plans to WISE. The assessment focused on the Strategies, which were reported; the Plans were reviewed for selected information.

⁵ The Scottish EPA (SEPA) stated subsequently that having complementary FRM Strategies and Local FRMPs is a requirement of the Flood Risk Management (Scotland) Act 2009. The FRM Strategy satisfies the requirements of the FRMP under the FD. The Local FRMPs were published six months later (22 June 2016).

⁶ In England and Wales there are Lead Local Flood Authorities, which have certain powers to manage flood risk from surface water, 'ordinary watercourses' (non-main rivers) and groundwater.

⁷ Supported by the Local Plan Districts, mentioned above.

⁸ <http://rod.eionet.europa.eu/obligations/603/deliveries?id=603&tab=deliveries&d-4014547-p=1&d-4014547-o=2&d-4014547-s=3>

Table 1 *Overview of UoMs in UK*

UoM	Names	Number of APSFRs	XML Reported	PDF Reported
UK01	SCOTLAND	206	Yes	Yes
UK02	SOLWAY TWEED	37	Yes	Yes
UK03	NORTHUMBRIA	-	Yes	Yes
UK04	HUMBER	3	Yes	Yes
UK05	ANGLIAN	1	Yes	Yes
UK06	THAMES	2	Yes	Yes
UK07	SOUTH EAST	1	Yes	Yes
UK08	SOUTH WEST	-	Yes	Yes
UK09	SEVERN	7	Yes	Yes
UK10	WESTERN WALES	2	Yes	Yes
UK11	DEE	-	Yes	Yes
UK12	NORTH WEST	2	Yes	Yes
UKGBNIIENB	NEAGH BANN	9	Yes	Yes
UKGBNIIENW	NORTH WESTERN	3	Yes	Yes
UKGBNINE	NORTH EASTERN	8	Yes	Yes
UKGI17	GIBRALTAR	-	No	No
TOTAL		281		

The FRMPs can be downloaded via the following websites:

- For England and Wales (UK02 to UK12):
https://www.gov.uk/government/collections/flood-risk-management-strategies_assessed-frmps-2015-to-2021 and https://naturalresources.wales/flooding/managing-flood-risk/developing-flood-risk-management-strategies_assessed/?lang=en
- For the Flood Risk Management Strategies prepared in Scotland (UK01 and part of UK02): <http://apps.sepa.org.uk/FRMStrategies/>
In addition, the local flood plans linked to the Strategies can be downloaded from another page on the Scottish EPA web site:
<https://www.sepa.org.uk/environment/water/flooding/local-frm-plans/>
- Northern Ireland (UKGBNIIENB, UKGBNIIENW and UKGBNINE):
<https://www.infrastructure-ni.gov.uk/publications/flood-risk-management-plans>

Overview of the assessment

The table below gives an overview of the evidence found during the assessment of the FRMPs. The following categorisation was used for the column concerning evidence:

- **Evidence to the contrary:** An explicit statement was found stating that the criterion was not met;

- **No evidence:** No information found to indicate that the criterion was met;
- **Some evidence:** Reference to the criterion is brief and vague, without a clear indication of the approach used for the criterion; depending on the comment in the adjacent column, “some evidence” could also be construed as “weak evidence”
- **Strong evidence:** Clear information provided, describing an approach followed in the FRMP to address the criterion.

Table 2 *Overview of the evidence found during the assessment of the FRMPs*

Criterion	Evidence	Comments
FRM objectives have been established	Strong evidence	The five FRMPs assessed include a list of established objectives. In the FRMP for Neagh Bann, UKGBNIIENB, the objectives refer to the whole UoM; and in the Welsh part of the Severn, UK09 FRMP, objectives refer to all the Welsh part of the UoM. There are also objectives set in the Local FRMPs for Wales that are specific to the local area. For the other FRMPs assessed – for Scotland (UK01), Solway Tweed (UK02, shared between Scotland and England) –as well as for the English part of UK09, each objective is assigned to a specific location: catchment, water body or town.
FRM objectives relate to...		
...the reduction of potential adverse consequences	Strong evidence	In all five FRMPs, the objectives aim to reduce the adverse consequences of floods.
...to the reduction of the likelihood of flooding	Some evidence	In all five FRMPs assessed, the objectives include the reduction of flood risk, a term which includes, at least by definition, the likelihood of flooding ⁹ . In one of the five FRMPs assessed, for the Neagh Bann UoM (UKGBNIIENB), moreover, one of the main objectives is to reduce the likelihood of flooding. For the other FRMPs assessed, there do not appear to be objectives specifically referring to the reduction of the likelihood of

⁹ The UK subsequently clarified that in discussing flooding in the UK, the word ‘risk’ is used for, and is widely understood to be, likelihood by consequence. This is also stated in the beginning of each of the FRMPs. The wording of objectives within the FRM strategies is focused on the overall reduction of flood risk, rather than flood likelihood. Some actions will result in a reduced likelihood but have not been explicitly captured as such.

Criterion	Evidence	Comments
		flooding.
...to non-structural initiatives	Some evidence	This aspect is specified in the definition of objectives in some of the FRMPs assessed. An example includes improving awareness in catchments which react rapidly to rainfall: this is an objective in two FRMPs (Neagh Bann, UKGBNIINB, and Severn, UK09). ¹⁰
FRM objectives consider relevant potential adverse consequences to...		
...human health	Strong evidence	In three of the five FRMPs assessed, the objectives refer to addressing human health, economic activity and the environment (including cultural heritage). In the two Scottish strategies assessed, specific objectives refer to residential and non-residential properties, transport, community facilities, and risks to people, for example, which represent economic activity and human health.
...economic activity	Strong evidence	See 'human health' above.
...environment	Strong evidence	See 'human health' above. For the two Scottish strategies assessed, environment is not addressed directly in the objectives.
...cultural heritage	Some evidence	See 'human health' above.
Measures have been...		
...identified	Strong evidence	The United Kingdom has reported 9 055 individual measures and 336 aggregated measures, for a total of 9 391 measures. The lowest numbers of measures are in the Northern Irish UoMs (from 27 to 42 each) and the highest number is in the Scotland UoM (UK01), 2 337 measures. The measures reported cover prevention (2 978 in all UoMs

¹⁰ SEPA subsequently highlighted that in the Scottish FRM strategies, non-structural initiatives are not specified via the objectives, but were a mandatory consideration in the development of all measures.

Criterion	Evidence	Comments
		reported), protection (3 359), preparedness (3 266) and recovery and review (146) as well as "other" (363) ¹¹ .
...prioritised	Some evidence	The UK has reported priorities for about 60 % of measures. Measures have been prioritised in the English, Scottish and Northern Irish FRMPs assessed. For the Western Wales UoM (UK10), no priorities were reported, and no priorities were reported for a high proportion of measures in three other UoMs. The FRMPs assessed do not provide detailed information on how priorities were set.
Relevant aspects of Article 7 have been taken into account such as...		
...costs & benefits	Some evidence	The FRMPs refer to cost benefit assessment as a criterion for the establishment of priorities for the selection of measures. With the exception of the Scottish strategies, further details were not reported, nor was evidence of such assessments provided. ¹²
...flood extent	Strong evidence	Historic flooding and flooding extents are described in the FRMPs.
...flood conveyance	Some evidence	In the two Scottish strategies assessed, conveyance routes are discussed in the description of measures and their potential impacts. There is no clear information whether conveyance routes have been taken into account for objectives and measures in the English, Welsh or Northern Irish FRMPs assessed ¹³ .
...water retention	Some evidence	Natural water retention measures (NWRMs)

¹¹ As some measures were reported for more than one measure type, there is some double-counting in these figures.

¹² Northern Ireland and SEPA clarified subsequently that detailed Benefit Cost appraisal is generally undertaken at a Measure (scheme) level. The FRMPs were undertaken at a 'strategic' level where full, detailed Benefit Cost appraisal would not have been done.

¹³ Environment Agency and Natural Resources Wales subsequently informed that almost all modelling of flood risk uses 2D techniques for assessing floodplains. Overland conveyance routes are therefore inherently and objectively included in the risk analysis and so they are automatically a part of the flood envelope, although they are not referred to explicitly. In terms of FRMP measures, conveyance is not a term that is used, particularly when talking to the public, but it forms an underlying part of the overall risk from flooding, used to identify particular measures.

Criterion	Evidence	Comments
		have been planned in four of the five FRMPs assessed, though they are promoted in all the FRMPs.
...environmental objectives of the WFD	Some evidence	The FRMPs assessed refer to the necessity of coordination between the FRMPs and River Basin Management Plan (RBMPs), and the obligation to foster the achievement of the WFD objectives, which often leads to the selection of sustainable solutions. The WFD was considered in objective-setting for the English and Welsh FRMPs assessed. The WFD was considered in the commentary of the specific measures where relevant in the Scottish strategies assessed ¹⁴ . It was unclear if this is the case for the Neagh Bann FRMP assessed.
...spatial planning/land use	Strong evidence	All five FRMPs assessed include references to land use, as well as measures to align with planning policies to prevent further damages.
...nature conservation	Strong evidence	All five FRMPs assessed refer to biodiversity and coordination with biodiversity authorities or partnerships. ¹⁵
...navigation/port infrastructure	Some evidence	The only plan that appears to consider ports and navigation in the consideration of measures is the Scottish Solway plan (in the Scottish part of UK02, Solway Tweed) ¹⁶ .
...likely impact of climate change	Strong evidence	The FRMPs assessed refer to climate change scenarios. The timeframes considered for climate change scenarios vary for the different FRMPs in the UK. Measures related to climate change are described in the FRMPs for

¹⁴ SEPA clarified subsequently by providing an example: Solway Action ID 140190006 “This flood protection scheme is proposed for the Black Stank (water body ID 10483). The physical condition of this river is identified by river basin management planning to be at less than good status. Future works could improve the condition of the river or degrade it. Opportunities to improve the condition of the river should be considered by coordinating with river basin management planning.” UK02 Solway Scottish part, p. 363.

¹⁵ SEPA subsequently clarified, explaining that all relevant measures included specific commentary regarding important environmental sites (e.g. Solway Action ID 140230005 “Natural flood management actions can have a positive impact by restoring and enhancing natural habitats. There are no international or national level environmental designations that are likely to be impacted by this action”).

¹⁶ Northern Ireland noted subsequently that UKGBNIIENB has only one outlet to the sea on a beach coastline, the catchment is primarily inland so has no port or harbour considerations.

Criterion	Evidence	Comments
		England (UK02 and UK09) and include incorporating climate change allowances into flood risk management works and identifying where working with natural processes can help improve resilience to climate change. In Northern Ireland, the Neagh Bann (UKGBNIIENB) FRMP indicates that preventative measures take account of climate change, and the Scottish strategies assessed refer to measures to study flood risk and any changes in the future due to climate change.
Coordination with other countries ensured in the RBD/UoM	Some evidence	One of the five FRMPs assessed, for the Neagh Bann UoM (UKGBNIIENB), is for part of an international UoM. It is indicated that there is coordination with the Republic of Ireland on all technical matters and proposed flood mitigation measures. However, it has not been specified in the FRMP whether flood risk areas have been coordinated and there are no maps showing areas of shared flood risk with the Republic of Ireland ¹⁷ .
Coordination ensured with WFD	Strong evidence	There is evidence of coordination of the FRMPs with the RBMPs under the WFD, in Scotland, Northern Ireland, England and Wales. In the Scottish strategies assessed, it is reported that the Scottish EPA is leading the delivery of RBMPs and FRMS and has worked to ensure that there is integration and coordination between them.
Active involvement of interested parties	Strong evidence	During the drafting process of all the FRMPs assessed, working groups were established with public institutions. Coordination also extended to a range of stakeholders, including via advisory councils at different levels, include UoMs, catchments and

¹⁷ Northern Ireland (UKNI) subsequently informed that for UKGBNIIENB, the catchment drains from Republic of Ireland (RoI) into Northern Ireland. While the catchment is a very large shared catchment, there are no shared APSFRs. Consultation between the jurisdictions has been 'strong' with Northern Ireland represented on RoI FD Steering and Working groups and formal meetings of respective competent authorities. Collaboration between UKNI and RoI was extensive in developing Flood Mapping – a key element of the Directive and underpinning the FRMPs.

Criterion	Evidence	Comments
		coastal areas.

Good Practices

The assessment identified the following good practices in the UK FRMPs assessed.

Table 3 *Good practices in the UK's FRMPs*

Topic area	Good practices identified
Objectives	The objectives are specific in terms of what they are trying to achieve and where. Measures have been linked with the objectives.
Planning/implementing of measures and their prioritization for the achievement of objectives	Many measures are clear in terms of their geographic location and coverage, responsible authority, general timetable. Promotion of sustainable land use practices has been planned in all of the FRMPs assessed. In some of the FRMPs, economic instruments for flood risk management such as insurance has been supported. The UK provides cost estimates for a large number of measures across all of its UoMs in the reporting sheets.
Climate change	All five FRMPs consider climate change scenarios, though the timeframes vary across the UK. The development of further studies to identify the effects of climate change is part of the measures planned in some of the FRMPs assessed.
Public consultation	Extensive coordination with local authorities and authorities from other departments (than those responsible for floods) was carried out in preparation of the FRMPs assessed, these included governmental departments, Non-Governmental Organisations (NGOs), utilities, transport, agriculture and professional institutes. In the five FRMPs assessed, mechanisms for the active involvement of stakeholders covered different levels (UoM level as well as that of catchments) and included a range of advisory groups.
Flood risk governance	There is evidence of coordination of the FRMPs with the RBMPs under the WFD for all FRMPs assessed.

Areas for further development

The assessment identified the following areas for further development in the UK FRMPs assessed.

Table 4 *Areas for further development in the UK's FRMPs*

Topic area	Areas identified for further development
Integration of previously reported information in the FRMPs	There is no clear information whether conveyance routes have been taken into account and how they are used to set objectives and measures, in the English, Welsh or Northern Irish FRMPs assessed ¹⁸ . Only the Neagh Bann (UKGBNIIENB) FRMP and the Scottish strategies provides information about the conclusions from the PFRAs or how they were used in the development of FHRMs. Not all of the FRMPs assessed provide summary maps of or links to the FHRMs. Some of the internet links to FHRMs provided in the FRMPs assessed are no longer working.
Setting of objectives for the management of flood risk	While some objectives could be measured, none have a quantitative target to achieve and in general the objectives are only descriptive. The Scottish FRM strategies, however, do provide indicators that can be used to measure progress towards objectives for each target area. Detailed information on what has been considered during the process of establishing the objectives is lacking in the FRMPs assessed ¹⁹ .
Planning/ implementation of measures and their prioritization for the achievement of objectives	The method to demonstrate by how much a measure will contribute to the objectives is unclear or lacking. For example, a baseline has not been established for all FRMPs (Scottish FRM strategies were the exception), against which progress will be monitored and assessed. It is unclear how measures were prioritised in the English FRMPs. (For the FRMPs in Scotland and Northern Ireland, this information is provided in separate technical documents ^{20, 21}). The overall budget per UoM is not provided for the UoMs assessed with the exception of the UKGBNIIENB FRMP. For a significant proportion of the total measures across all UoMs in the United Kingdom did not report costs in WISE (38 %). It is indicated in the FRMPs that measures do not all have secured funding and are not guaranteed to be implemented ^{22 23} .
Consideration of climate	Even though different climate change scenarios were considered,

¹⁸ Environment Agency and NRW informed subsequently that almost all modelling of flood risk uses 2D techniques for assessing floodplains. Overland conveyance routes are therefore inherently and objectively included in the risk analysis and so they are automatically a part of the flood envelope, although they are not referred to explicitly. In terms of Flood Risk Management Plan measures, conveyance is not a term that is used, particularly when talking to the public, but it forms an underlying part of the overall risk from flooding, used to identify particular measures.

¹⁹ SEPA subsequently informed that a great amount of detail behind this work is captured in separate technical documents, not in the FRM strategies themselves.

²⁰ UKNI subsequently stated that methodologies for prioritisation of schemes and community resilience engagement are available, but not included in the FRMPs.

²¹ SEPA subsequently stated that there was a great amount of detail behind this work which is captured within separate technical documents, not in the FRM strategies themselves.

²² SEPA subsequently stated that funding and delivery responsibility is expressly excluded from the FRM strategies and contained within the complementary Local FRMPs.

Topic area	Areas identified for further development
change in the FRMPs assessed	there is a lack of detail on shifts in the occurrence of extreme events and changes in numerical recurrence times or on whether the main sources of flooding will change under the long-term climate change scenarios ²⁴ . Coordination between FRMPs and climate change adaptation strategies appears not to be systematic.
Use of cost-benefit analysis in the FRMPs assessed	For the FRMPs in England, Wales and Northern Ireland, there is no explanation of what is included in the calculation of cost benefit analysis and for what measures it was undertaken for ²⁵ .

Recommendations

Based on the reported information and the FRMPs assessed, the following recommendations are made to enhance flood risk management (not listed in any particular order):

- Ensure that FRMPs, PFRAs/APSFRs and FHRMs refer to each other as appropriate and that they are continuously available to all concerned and the public in an accessible format, including digitally.
- To be able to assess progress, the achievement of the objectives of the FRMPs should be measurable to the greatest extent possible.
- The methodology for assessing measures in terms of costs and benefits as well as its application and results of this analysis should be presented.
- The prioritisation of the measures should be better documented, including the process.
- In all FRMPs, the estimated cost should be reported for measures and an explanation of how a lack of funding may impact the implementation of the measures should be provided.
- Climate change should be considered more deeply in the second cycle, including how sources of flooding may change in the future, and changes in extreme events, as well as better integration with and references to the National Climate Change Adaptation Strategy.

²³ UKNI subsequently highlighted it may not be possible to guarantee funding over the FRMPs' timeframe. For flood alleviation schemes for example, detailed assessments are required at feasibility stage before funding can be secured.

²⁴ The UK recalled subsequently that assessment of impacts of climate change was not mandatory for the first cycle of implementation of the FD.

²⁵ UKNI subsequently stated that NI FRMPs were developed at a strategic level so for many proposed measures in the FRMPs, full benefit cost assessments would not have been done.

1. Scope of the assessment and sources of information for the assessment

1.1 Reporting of the FRMPs

The UK has reported 36 FRMPs in total: 14 FRMPs for England, Wales and Northern Ireland, each covering a single UoM; an additional eight separate FRMPs prepared at the level of the Lead Local Flood Authorities (LLFAs) in Wales²⁶; and 14 Flood Risk Management Strategies for Scotland, covering sub-areas within UoM UK01 (Scotland) and UK02 (Solway Tweed)²⁷. (When this report refers to “the FRMPs assessed”, it includes the two Scottish strategies reviewed under this exercise.) The UK has not yet reported an FRMP for Gibraltar (UKGI17).

The UK did not make use of Article 13.3 of the FD, which allows Member States to make use of previous flood risk management strategies assessed (provided their content is equivalent to the requirements set out in the Directive).

1.2 Assessment of the FRMPs

The approaches for FRMPs between Scotland, Northern Ireland, and England and Wales are different²⁸. For example, Scotland did not prepare its strategies at UoM level but rather at the level of local catchment areas and areas of management²⁹. The structure and content of the FRMPs across the jurisdictions differ. Therefore, a subset of UoMs and FRMPs have been selected for assessment with the aim to cover the four jurisdictions of the United Kingdom and thus the different methodological approaches taken. The UoMs and FRMPs covered by the assessment are:

²⁶ NRW subsequently clarified that there are eight separate LLFA FRMPs covering surface water produced in Wales, six of which were part of the Severn FRMP and two part of the Western Wales FRMP.

²⁷ Scotland also produced 14 Plans which supplement the Flood Risk Management Strategies, setting out prioritised actions to tackle flooding. These local Flood Risk Management Plans were not reported to WISE but those for Clyde and Loch Lomond and Solway were reviewed in this assessment for specific information.

²⁸ The UK noted subsequently that each jurisdiction has its own governmental arrangements, structures, funding for flood risk management and therefore different approaches. These different approaches are carefully co-ordinated and are consistent with good flood risk management across the UK and between the competent authorities within shared RBDs. A UK co-ordination group meets every two months to discuss these arrangements and the respective competent authorities have their own governance arrangements in place to ensure consistency and compliance with the Directive. For example, there is a statutory Cross Border Advisory Group between England and Wales, which co-ordinates arrangements in respect of our shared RBDs.

²⁹ SEPA subsequently clarified that the reason for this is that the ‘Scotland’ RBD is not a single major catchment and that it contains a number of hydrologically discrete large catchments, and these have been used to shape the strategies.

Table 5 *FRMPs and UoMs covered in the assessment*

UoM code	UoM Name and FRMP assessed
UK01	Clyde and Loch Lomond (C&LL, part of UK01 in Scotland);
UK02	Solway (in the Scottish part of UK02);
UK02	Solway Tweed (for the English Part of UK02)
UK09	Severn (jointly managed by England and Wales)
UKGBNIIENB	Neagh Bann (Northern Ireland)

The FRMP for Solway Tweed (English part) states that there are no known significant cross border flood risk issues along the main rivers between England and Scotland^{30, 31}.

³⁰ UK02 (English part) FRMP, p.23.

³¹ SEPA subsequently clarified that although Solway and Tweed are cross-border with England, in reality, due to the nature of the tributary watercourses, there is relatively little ‘cross-border risk’, therefore it is not a major issue.

2. Integration of previously reported information

2.1 Conclusions drawn from the preliminary flood risk assessment

Each of the FRMPs refers to the PFRAs in the introductory sections to the FRMPs³². (The United Kingdom applied Art. 13(1)(b) in England and Wales: under this provision, the UK did not undertake PFRAs in England and Wales, using FHRMs prepared before December 2010³³.) The conclusions of the PFRAs are discussed in detail only in the Neagh Bann (UKGBNIIENB) FRMP (in Section 5), where the conclusions for each Significant Flood Risk Area (SFRA)³⁴ are discussed. Maps of the APSFRs are provided in some of the FRMPs assessed as follows:

- The Neagh Bann (UKGBNIIENB) FRMP provides a map of Significant Flood Risk Areas (SFRA) across Northern Ireland and lists the ones relevant to Neagh Bann.
- A Flood Risk Area map is shown in the Severn (UK09) FRMP.
- No Flood Risk Areas are shown in the UK02 (Solway Tweed – English part) FRMP³⁵.
- In the Scottish FRMS (Clyde and Loch Lomond, UK01, and Solway, UK02) the Potentially Vulnerable Areas³⁶ are shown on a map for each Local Plan District area³⁷.

Links to maps of the APSFRs are not provided in the FRMPs assessed.

There was little information provided within the FRMPs themselves about whether conveyance routes have been taken into account in the PFRAs and the FRMPs³⁸. In the Scottish strategies assessed (Clyde and Loch Lomond in UK01 and Solway in UK02), conveyance routes are

³² E.g. UKGBNIIENB p. 45; Scottish FRMSs (UK01 and UK02 Solway) p. 2; and UK02 (English part) in Section 7.

³³ European Commission, Assessment of data and information reported by Member States on their PFRAs and identification of Areas of Potentially Significant Flood Risk under the FD: Member State Report United Kingdom, 2015. Available at:

http://ec.europa.eu/environment/water/flood_risk/pdf/pfra_reports/PFRA%20Report%20-%20UK.pdf

³⁴ UKGBNIIENB FRMP p.45 “The principle objective of the PFRA was to identify those geographical areas where ‘potential significant flood risk exists or might be likely to occur’. The identification of these areas, known as Significant Flood Risk Areas (SFRAs)”.

³⁵ The UK subsequently noted that this is due to no FRAs having been identified in the Solway Tweed – English part.

³⁶ UK01 and UK02 FRMS, Page 2 “Based on the National Flood Risk Assessment, SEPA identified areas where flooding was considered to be nationally significant. These areas are based on catchment units as it is within the context of the wider catchment that flooding can be best understood and managed. These nationally significant catchments are referred to as Potentially Vulnerable Areas. In Scotland, 243 Potentially Vulnerable Areas were identified.”

³⁷ UKGBNIIENB FRMP pp.48-49; UK09 FRMP, Part A, p.51; UK02 (English part) FRMP, Part A, p.20; UK01 and UK02 FRMS, Figure 2 on Page 15.

³⁸ Environment Agency and NRW subsequently informed that almost all modelling of flood risk uses 2D techniques for assessing floodplains. Overland conveyance routes are therefore inherently and objectively included in the risk analysis and so they are automatically a part of the flood envelope, although they are not referred to explicitly. In terms of FRMP measures, conveyance is not a term that is used, particularly when talking to the public, but it forms an underlying part of the overall risk from flooding, used to identify particular measures.

discussed in the description of measures and their potential impacts. In the Neagh Bann (UKGBNIIENB) FRMP, conveyance routes are only briefly mentioned in the context of flood risk maps. One of the measures in the UK09 FRMP is to “Assess conveyance requirements and implement maintenance”. There is no reference to conveyance routes in the UK02 (English part) FRMP³⁹.

2.1.1 Coordination with neighbouring Member States on shared RBDs/UoMs

Neagh Bann (UKGBNIIENB) is an international UoM shared with the Republic of Ireland. It is indicated that there is coordination with the Republic of Ireland on all technical matters and proposed flood mitigation measures. The FRMP does not indicate whether cross-border flood risk areas were identified^{40 41}.

2.1.2 Information how the PFRA was used in the development of the FHR maps

In Section 4.1 of the Neagh Bann (UKGBNIIENB) FRMP, an overview of the PFRAs was provided, along with a summary of where further identification of new flood risk areas was undertaken. In Section 1.3 of the Scottish FRM strategies, the link between National Flood Risk Assessment, APSFRs and FHRMs is set out. There is no information provided in the English or Welsh FRMPs assessed on how the PFRAs were developed and used for the development of FHRMs, nor if there were changes in the flood risk mapping as a result of the PFRAs.

2.2 Presentation of Flood Hazard and Risk Maps in the FRMPs

Flood Hazard and Risk Maps (FHRMs) are presented only in some of the FRMPs assessed⁴²:

- In the Scottish FRMPs (Clyde and Loch Lomond in UK01 and Solway in UK02), no flood risk maps are reproduced⁴³.
- In Section 5 of the Neagh Bann (UKGBNIIENB) FRMP there are detailed flood extent maps presented for fluvial and seawater floods.

³⁹ UK01 and UK02 Solway FRMS, Section 2; UKGBNIIENB FRMP, p.24; UK09 FRMP, Part B.

⁴⁰ UKGBNIIENB FRMP, p.63.

⁴¹ NI subsequently informed that for UKGBNIIENB, the catchment drains from Republic of Ireland (RoI) into Northern Ireland. While the catchment is a very large shared catchment, there are no shared APSFRs. Consultation between the jurisdictions has been ‘strong’ with Northern Ireland represented on RoI FD Steering and Working groups and formal meetings of respective competent authorities. Collaboration between NI and RoI was extensive in developing Flood Mapping – a key element of the Directive and underpinning the FRMPs.

⁴² UKGBNIIENB FRMP, p. 17; UK09 FRMP, Part A, p.9; UK02 (Solway Tweed - English part), Part A, p. 20; Scottish FRMSs (UK01 and UK02 Solway), p.3.

⁴³ SEPA subsequently clarified that the reason maps were not reproduced within the FRMPs was that flood hazard maps with national coverage, for a range of likelihoods, were available on SEPA’s website allowing users to zoom in and view detail at catchment level.

- In the English FRMPs assessed (Solway Tweed for the English part of UK02 and Severn for UK09, Severn, shared with Wales), flood risk maps have been reproduced for fluvial, seawater floods and floods from artificial water bearing infrastructure. The maps and statistics contained in the Solway Tweed and Severn FRMPs are said to be based on the Updated Flood Map for Surface Water (UMfSW) published in December 2013, but surface water flooding maps are not contained within the FRMP.

None of the FRMPs assessed presents FHRMs that cover groundwater floods.

Links to the FHRMs are provided in all five of the FRMPs assessed. However, some of the links provided are no longer working⁴⁴. The working links are:

- Neagh Bann (UKGBNIIENB) and other UoMs in Northern Ireland: <http://dfi-ni.maps.arcgis.com/apps/webappviewer/index.html?id=fd6c0a01b07840269a50a2f596b3daf6>
- Severn (UK09) and UK02 (Solway Tweed - English part) and other UoMs in England and Wales: <https://www.gov.uk/government/collections/river-basin-districts-flood-risk-maps> and <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>
- Scottish FRMSs (Clyde and Loch Lomond, UK01, and Solway, UK02): <http://map.sepa.org.uk/floodmap/map.htm>

2.2.1 Conclusions drawn from the flood hazard and flood risk maps

In all the FRMPs, FHRMs have been used to develop the FRMPs⁴⁵. Based on the reporting sheets and the FRMPs assessed:

- FHRMs are used to set priorities for flood risk management (e.g. locations, economic activities, assets);
- FHRMs are used as a tool in the public consultation process;
- Measures have been defined based on the FHRM.

The approaches vary across the five FRMPs assessed. In the Neagh Bann (UKGBNIIENB) FRMP, it is noted that flood maps were made available for public information and a publicity campaign was run to make the public aware of them. Whilst the flood risk maps are publicly available in rest of the UK, the other FRMPs do not detail how the maps were used in the public consultation process. In the Neagh Bann (UKGBNIIENB) FRMP, it is stated that flood maps were designed to enable flooding agencies, infrastructure providers and others to manage

⁴⁴ The UK clarified subsequently that due to reorganisation the links changed and provided new links. The European Commission makes public the relevant internet links on: http://ec.europa.eu/environment/water/flood_risk/links.htm

⁴⁵ The UK applied Art. 13(1)(b) for the PFRA stage in England and Wales, as noted above. The UK did not apply Art. 13(2) for the FHRM stage.

their work to reduce flood risk; encourage people living and working in areas prone to flooding to take appropriate action; and to inform anyone applying for planning permission if flooding is likely to be a material consideration⁴⁶.

In the English FRMPs (Solway Tweed for the English part of UK02 and Severn, UK09) it is stated that in developing the proposed measures, conclusions were drawn from hazard and risk maps which help to identify risks and opportunities. In the Scottish strategies assessed (Clyde and Loch Lomond in UK01 and Solway in the Scottish part of UK02), it is stated that the FHRMs helped inform the selection of measures to manage flood risk in Potentially Vulnerable Areas⁴⁷. Target areas within the Potentially Vulnerable Areas have been set to focus measures. A qualifier is included which states that the target areas do not necessarily correspond to areas at risk in the flood mapping^{48, 49}.

2.3 Changes to the APSFRs or other Flood Risk Areas

The FRMP assessment looked for information on changes in the identification of APSFRs since December 2011, or in the FHRMs since December 2013, indicated in the FRMPs. It is not clear from the information provided in the FRMPs whether there have been any changes on the identification of APSFRs since December 2011⁵⁰. There is also very little information about whether there have been any changes to the FHRMs since December 2013. However, the Scottish strategies assessed (Solway in the Scottish part of UK02 and Clyde and Loch Lomond in UK01) do indicate that flood hazard and flood risk maps were developed by SEPA between 2012 and 2014⁵¹.

⁴⁶ The NI authorities recounted subsequently that they followed the FD process. They took the information they had developed out of strategic & historic flood mapping and from the PFRA assessment, they focused effort and resource on the APSFRs derived from PFRA stage to generate greater detail in mapping, modelling and in producing objectives and measures for the FRMPs which would have the most beneficial effects on reducing flood risk. Examples of good practice, in terms of development control and emergency planning were reinforced throughout the Plans.

⁴⁷ SEPA subsequently recounted that each completed stage and new understanding and evidence had driven the next.

⁴⁸ UKGBNIIENB FRMP, p.55; UK02 Solway Tweed - English part and UK09 FRMPs, Part A, p.53; UK02 Solway - Scottish part and UK01 FRMS, p. 2.

⁴⁹ SEPA subsequently explained that “this qualifier was included to indicate that the entirety of the identified target area is not at risk of flooding – it encompasses the flooding but is buffered to include a sensible boundary area and avoid an overly specific targeting zone, given the strategic nature of the mapping driving the targeting”. This statement appears to not have caused specific concern to partners / public.

⁵⁰ SEPA subsequently explained that there are some areas that were considered as Candidate Potentially Vulnerable Areas. This is explained in the FRMP as follows: “area was not originally identified as a Potentially Vulnerable Area in 2011. However, updated information on flood risk from the new hazard maps identified that this area should be regarded as a candidate Potentially Vulnerable Area due to the risk to people and properties.” UK01 Clyde and Loch Lomond FRMP – p. 332.

⁵¹ UK02 Solway - Scottish part and UK01 FRMS, p. 2.

2.4 Areas for further development in the earlier assessment of the FHRMs

The FHRM assessment⁵² identified the following areas for further development for the UK:

- Scenarios, Article 6(3): According to Art. 6(3), flood hazard maps shall cover the geographical areas which could be flooded according to three scenarios: floods with low probability, medium probability and high probability, where appropriate. Some UoMs (e.g. UK_02_England, UK03, UK06 and UK12) did not report the maps for floods with a medium probability scenario.
- Hazards elements - Water depth/level: According to Art. 6(4)(b) Member States shall report for each probability scenario the flood extent and the water depth or level, as appropriate. Several UoMs (e.g. UK04, UK06 and UK07) did not show the water depth/level in the FHRMs.
- Adverse consequences - Type of economic activity: According to Art. 6(5)(b) flood risk maps shall show the potential adverse consequences associated with flood scenario in terms of type of economic activity. Most of the UoMs in the UK (UK_02_England, UK03, UK04, UK06, UK07, UK12 and UKGBNIIENB) did not show the type of economic activities in their FHRMs.
- Adverse consequences - industrial installation and WFD areas: According to Art. 6(5)(c) flood risk maps shall show the potential adverse consequences associated with a flood scenario in terms of location of Industrial Emissions Directive installations. Most of the UoMs in the UK (UK_02_England, UK_02_Scotland, UK03, UK04, UK06, UK07, UK12 and UKGBNIIENB) did not show the location of industrial installations in their FHRMs.
- Consequences on the environment – it appears that no potential adverse consequences on the environment were shown in the maps, in particular for low and medium probability fluvial floods.

While these areas for further development identified in the earlier assessment of the FHRMs are not explicitly addressed within the FRMPs assessed or the reporting, a review of the FHRMs has found the following:

- For all the FRMPs assessed, maps for floods with a medium probability scenario were found. This also included Solway Tweed, for the English part of UK02, which had not previously, therefore this area for further development appears to have been addressed.

⁵² Based on: European Commission, Assessment of Flood Hazard and Flood Risk Maps – Member State Report: UK - United Kingdom, December 2014. Available at: http://ec.europa.eu/environment/water/flood_risk/pdf/fhrm_reports/UK_%20FHRM_%20Report.pdf

- The FHRMs were not reproduced or described within the FRMPs, but from a brief review of the mapping in the external links⁵³, it can be concluded that progress has been made towards addressing hazard elements and adverse consequences:
 - For Northern Ireland, links to PDF documents are given in each area, which include risk maps of these scenarios (low, medium and high probability) containing data on the estimated number of inhabitants likely to be affected, the cost, as well as mapping environmentally sensitive sites nearby which could be at risk. The Neagh Bann (UKGBNIIENB) FRMP explains that flood risk indicators were generated within 1km grid squares to assess the potential adverse consequences on the environment (not reproduced within the FRMP)⁵⁴. No information on water depths was available.
 - For England and Wales, in the “detailed” map view, flood depths (in millimetres) are available for each flood risk category for surface water flooding and for four flood risk scenarios (very low to high probability). No consequences of flooding were available. In the English FRMPs it is explained that a computer model was used to estimate the likelihood of flooding from rivers and the sea, and can be used in conjunction with receptor data to estimate the consequences. A summary of flood risk to the natural and historic environment across is provided in a table.
 - For Scotland, data is shown on the map to show extent, such as the numbers of inhabitants at risk, economic and community activities at risk, and the environmental sites at risk for each likelihood level (low/medium/high). Water depths are also given for each likelihood.
 - For Scotland, data on the map shows the environmental sites (which includes IPPC sites) at risk for each likelihood level.

Consequently, the majority though not all of the previously identified areas for further development have been addressed in the time period between publication of the FHRMs and the assessment of the FRMPs.

⁵³ FRMPs assessed and external map links:

- Northern Ireland: <http://dfi-ni.maps.arcgis.com/apps/webappviewer/index.html?id=fd6c0a01b07840269a50a2f596b3daf6>
- England and Wales: <https://www.gov.uk/government/collections/river-basin-districts-flood-risk-maps>
- Scotland: <http://apps.sepa.org.uk/FRMStrategies/>

⁵⁴ NI subsequently clarified that the FRMPs were developed at a strategic level i.e. there was little detail on specific measures or their particular, site-specific impacts on the environment or on sites of environmental designation. NI further stated that environmental documents which accompanied the NI FRMPs fully covered the strategic assessment of the likely impacts of the types of physical measures proposed, on the environment and on sites of environmental designation.

2.5 Good practices and areas for further development in the FRMPs regarding integration of previously reported information⁵⁵.

The following **areas for further development** were identified:

- There is no clear information whether conveyance routes have been taken into account and how they are used to set objectives and measures, in the English, Welsh and Northern Irish FRMPs assessed⁵⁶.
- Only the Neagh Bann (UKGBNIIENB) FRMP and the Scottish strategies provides information about the conclusions from the PFRAs or how they were used in the development of FHRMs.

⁵⁵ The NI authorities recounted subsequently that they followed good practice in the whole logical FD process. They took the information they had developed out of strategic & historic flood mapping and from the PFRA assessment, they focused effort and resource on the APSFRs derived from PFRA stage to generate greater detail in mapping, modelling and in producing objectives and measures for the FRMPs which would have the most beneficial effects on reducing flood risk. Examples of good practice, in terms of development control and emergency planning were reinforced throughout the Plans. Similarly, SEPA recounted how each completed stage and new understanding and evidence had driven the next.

⁵⁶ Environment Agency and NRW informed subsequently that almost all modelling of flood risk uses 2D techniques for assessing floodplains. Overland conveyance routes are therefore inherently and objectively included in the risk analysis and so they are automatically a part of the flood envelope, although they are not referred to explicitly. In terms of Flood Risk Management Plan measures, conveyance is not a term that is used, particularly when talking to the public, but it forms an underlying part of the overall risk from flooding, used to identify particular measures.

3. Setting of Objectives

3.1 Focus of objectives

The focus of the objectives varies across the five FRMPs assessed:

- Objectives in the Neagh Bann (UKGBNIIENB) FRMP are split into economic, human health and social, and environmental objectives. The objectives are defined under these themes and are broken down further (with slightly more detail in the appendix) and include, as examples, reducing economic damages to properties, reducing the risk to life and raising awareness of the consequences of flood risk and mitigating the impact on priority species and habitats. The Appendix also links the objectives with the measures.
- In the FRMPs for the Severn (UK09)⁵⁷ and Solway Tweed (English part of UK02), objectives are categorised as environmental, economic or social (people and communities). Objectives aim to minimise impacts of flooding, reduce flood risk, and enhance the natural environment where possible. More detailed objectives have been set for each catchment (sub-basin) in the UoMs. Some examples of objectives include: improving awareness in catchments which react rapidly to rainfall, reducing flood risk to residential properties and maintaining and enhancing habitats through flood risk management activities.
- In the Scottish strategies assessed – Clyde and Loch Lomond (in UK01) and Solway (in the Scottish part of UK02) – there were two general objectives: "avoid an overall increase in flood risk" and "reduce overall flood risk". There are more objectives that are linked to the target areas such as "Reduce the economic damages and risk to people from surface water flooding in Erskine", "Reduce the risk of flooding from the Gotter Water and River Gryfe to residential properties in Quarriers Village" or "Accept the current standard of protection offered by the Portpatrick Flood Protection Scheme". In the Scottish strategies, the objectives include references to residential and non-residential properties, transport, community facilities, and risks to people. Environment is not addressed directly in the objectives, but it is dealt with in the commentary for all the relevant measures which are linked to the objectives. All the objectives are clearly linked to the measures⁵⁸.

Consequently, in the FRMPs assessed⁵⁹:

⁵⁷ Separate objectives are developed for the English and Welsh parts of the UoM.

⁵⁸ UKGBNIIENB FRMP, Appendix H; UK09 FRMP, Part A, Table 8.1 on p.57, Part B, section 4; UK02 Solway Tweed FRMP, Part A, Table 10 on p.75, Part B, section 4; Scottish FRMSs (UK01 and UK02 Scottish part), Section 2, p.17.

⁵⁹ These categories are included in Art. 7 of the FD. The assessment adopts the generally accepted definition of risk as a product of consequence times likelihood, thereby also in alignment with Art. 7(2) of the FD.

- In all five FRMPs, the objectives aim to reduce the adverse consequences of floods.
- In some of the FRMPs, the objectives refer to measures that will be implemented.
- In some of the FRMPs, the objectives refer to non-structural measures⁶⁰.

3.2 Specific and measurable objectives

Overall, it is indicated where the objectives will be achieved and how; while some objectives are measurable, none have a quantitative target to achieve. Moreover, the FRMPs are not specific in terms of the timescales for the achievement of objectives.

In the FRMPs assessed, all the objectives refer to a location. For the English FRMPs and Scottish Strategies assessed, the objectives are assigned to a specific catchment, water body or town specific level. An example objective is "To reduce the risk to life, health and wellbeing". The FRMP for Neagh Bann (UKGBNIIENB) in Northern Ireland, on the other hand, only applies objectives for the whole UoM. The same is true for the Welsh objectives in the UK09 FRMP; there are, however, objectives set in the Local FRMPs that are specific to the local area⁶¹.

Only the Scottish FRM strategies provide indicators from which the objectives can be measured for each target area (e.g. Avoid an overall increase in flood risk: 3 900 residential properties; 900 non-residential properties and 8 600 people⁶²). Whilst the objectives of the other FRMPs assessed are only descriptive in form, each objective has measures linked with them in the FRMPs. The majority of the measures are specific in what they will achieve. For example: "Target resources to reduce the risk of flooding to communities with the highest flood risk". However, there do not appear to be any specific numerical targets for achievement in any of the UoMs. Generic timelines for delivery of measures against the objectives are provided in each of the FRMPs e.g. ongoing or 2015-2021⁶³; however, the FRMPs do not specify that the objectives are to be achieved by this date⁶⁴.

3.3 Objectives to reduce adverse consequences from floods

The FRMPs have been set to reduce the adverse consequences from floods, namely: the number of fatalities and dwellings flooded, the adverse consequences on human health,

⁶⁰ Non-structural measures include measures such as flood forecasting and raising awareness of flooding as well as land use planning, economic instruments and insurance.

⁶¹ e.g. Cardiff FRMP p.20

⁶² SEPA subsequently informed that target areas have been set to focus actions; these areas do not necessarily correspond to areas at risk in SEPA's flood map. Indeed, in some cases the target areas encompass adjacent areas, which are not at risk.

⁶³ UK01 FRMS Section 2; UK09 FRMP Part C.

⁶⁴ The UK stated subsequently that it is difficult to always be specific with deadlines for achievement of objectives and measures which are very influenced by various factors over the 6-year cycle, e.g. change in priority, available funding etc.

cultural heritage, the environment and economic activities. Objectives refer to reductions in economic, social and environmental impacts in each of the UoMs assessed.

3.4 Objectives to address the reduction of the likelihood of flooding

In all five FRMPs assessed, the objectives include the reduction of flood risk, a term which includes the likelihood of flooding⁶⁵. In the Neagh Bann FRMP, one of the main objectives is to reduce the likelihood of flooding⁶⁶. For the other FRMPs assessed there do not appear to be objectives that specifically refer to reducing the likelihood of flooding⁶⁷.

3.5 Process for setting the objectives

The objectives were generally established by the authorities for England, Northern Ireland, Scotland and Wales, such as the Environment Agency in England and the Scottish Environmental Protection Agency. The FRMPs generally do not contain a lot of information on what has been considered in establishing the objectives. The Neagh Bann (UKGBNIIENB) FRMP states that the draft objectives were consulted with stakeholders as part of the consultations on the draft FRMP⁶⁸. It was explained in the reporting sheets that SEPA set initial objectives based on the evidence on the causes and impacts of flooding⁶⁹. The initial objectives were then refined following engagement with local authorities and other stakeholders⁷⁰. In the Scottish FRMPs assessed, objectives were set for all APSFRs and at a regional scale.

3.6 Good practices and areas for further development regarding setting objectives

The following **good practice** was identified:

- The objectives are specific in terms of what they are trying to achieve and where. Measures have been linked with the objectives.

The following **areas for further development** were identified:

⁶⁵ The assessment adopts the generally accepted definition of risk as a product of consequence times likelihood, thereby also in alignment with Art. 7(2) of the FD.

⁶⁶ UKGBNIIENB FRMP pp.31

⁶⁷ The UK subsequently clarified that in discussing flooding in the United Kingdom, the word 'risk' is used which is widely understood to be likelihood by consequence. This is also stated in the beginning of each of the FRMPs. The wording of objectives within the FRM strategies in Scotland is focused on the overall reduction of flood risk, rather than flood likelihood. Some actions will result in a reduced likelihood but have not been explicitly captured as such.

⁶⁸ UKGBNIIENB FRMP, p.20.

⁶⁹ Scottish reporting sheets.

⁷⁰ Scottish reporting sheets and Scottish FRMS (UK01 and UK02 Solway - Scottish part), p.3.

- While some objectives could be measured, none have a quantitative target to achieve and in general the objectives are only descriptive (e.g. target resources to reduce the risk of flooding to communities with the highest flood risk). The Scottish FRM strategies however do provide indicators that can be used to measure progress towards the objectives for each target area.
- Information on what has been considered during the process of establishing the objectives is lacking for most FRMPs assessed⁷¹.

⁷¹ SEPA subsequently highlighted that there is some information in the reporting sheets which shows that SEPA set initial objectives based on the evidence on the causes and impacts of flooding. They also highlighted that there is a great amount of detail behind this work which is captured within separate technical documents, not in the FRM strategies themselves.

4. Planned measures for the achievement of objectives

The United Kingdom has indicated, across all 15 UoMs that have reported⁷², 9 055 individual measures and 336 aggregated⁷³ measures⁷⁴. The total number of measures in the UK is thus 9 391. The FRMPs do not explain how individual and aggregated measures are defined.

Some of the measures are assigned to more than one measure type⁷⁵. To compare the number of measures by type, a total count of the measures is used, which includes each time a measure is allocated to a measure type (this involves double-counting): this total is 9 888 measures.

The range in number of measures reported for each UoM goes from 27 to 2 337 measures. The lowest numbers of measures are in the Northern Irish UoMs (from 27 to 42) and the highest numbers are in UK01 Scotland (2 337, 24 % of all measures reported for the UK)⁷⁶. The measures reported cover all four aspects as well as “no action” and other measures⁷⁷, with the most measures being prevention, protection and preparedness measures. More specifically, the aspects covered are: no action (44 measures or around 0.4 % of the total); prevention (2 978 measures or about 30 % of the total); protection (3 359 measures or around 34 % of the total); preparedness (3 266 measures or around 33 % of the total); recovery and review (146 measures or around 1.5 % of the total) and other (95 measures or nearly 1 % of the total). Prevention, protection and preparedness measures are planned in all UoMs, while recovery and review, no action and other measures are not found in some of the UoMs. All measure types are covered.

Please see Annex A for supplementary tables and charts on measures for this and subsequent questions in this section.

4.1 Cost of measures

Table 6 *Estimated overall budget for the measures in the assessed FRMPs*

	Estimated overall budget of planned measures (2015-2021) in GBP
UKGBNIENB	144 844 000

⁷² The UK has not reported for Gibraltar as there were no APSFRs identified.

⁷³ The Reporting Guidance mentions “Measures can be reported as individual measures (recommended for major projects) or aggregated measures,...” and also notes that measures may be comprised of “many individual projects”. European Commission, Guidance for Reporting under the FD (2007/60/EC), 2013, pp. 54-58.

⁷⁴ The information reported to WISE was the starting point for the assessment in this section. The majority of the statistics presented are based on processing of information reported to WISE. Assuming that the Member States accurately transferred the information contained in their FRMPs to the reporting sheets (the sheets are the same for all Member States and are not customisable) and barring any undetected errors in the transfer of this information to WISE arising from the use of interfacing electronic tools, these statistics should reflect the content of the FRMPs.

⁷⁵ See Annex B for the list of all measure aspects and measure types.

⁷⁶ NI subsequently highlighted that the number of measures relate to the level of risk and the level of detail within the plan, direct comparisons therefore should not be made.

⁷⁷ See Annex B for the list of all measure aspects and measure types.

Only one of the five FRMPs assessed, Neagh Bann (UKGBNIIENB), presented an overview of the total costs of measures⁷⁸ – shown in the table above. In Scotland this detail is contained in the Local FRMPs⁷⁹.

In its reporting sheets, the UK provided information on the costs of 6 110 measures (or around 62 % of all measures reported) across all the UoMs. Three measures were reported as having been included in other programmes, one measure was reported as “NIL” for costs. The highest cost for a measure was between £350 m and £750 m. The majority of the measures for which this information is provided cost less than GBP 100 000 (about EUR 115 000) or between GBP 100 000 and 500 000 (about EUR 575 000). The highest costs are reported for protection measures and measures in the three Northern Irish UoMs⁸⁰ (for further details see Tables A5 and A6 in Annex A).

Among the five FRMPs assessed, the plan for the Neagh Bann UoM (UKGBNIIENB) was the only one to present overall cost forecast or budget for the measures planned:

- The Neagh Bann (UKGBNIIENB) FRMP in Northern Ireland reported the costs by measure aspect: GBP 3 m for prevention measures (approximately EUR 3.4 m), GBP 137.6 m for protection measures (approximately EUR 155 m) and GBP 4.2 m (EUR 4.8 m) for preparedness – thus totalling around GBP 144.8 m, about EUR 164 m. This equates to 95 % of all costs going to protection measures, 2 % for prevention measures and 3 % for preparedness measures.
- The Flood Risk Management Strategy for Clyde and Loch Lomond (in UK01 Scotland) does not provide cost information^{81,82}.
- The English strategies assessed, Solway (UK09) FRMP and the Solway Tweed FRMP (UK02 - English part), reported that their measures do not all have secured funding and are not guaranteed to be implemented. Money is allocated to Risk Management

⁷⁸ NI subsequently highlighted that this relates to the level of detail within the plan.

⁷⁹ SEPA subsequently clarified that this is the remit of the Local FRMPs and not the FRM Strategies.

⁸⁰ Reporting sheets.

⁸¹ Scotland subsequently highlighted that cost information is beyond the scope of the Scottish strategies.

⁸² Some cost information (e.g. investment by Scottish Water to reduce flooding) may be found in the Local Flood Risk Management Plans; these Plans however were not reported to WISE.

Authorities⁸³ based on government policy that gives the highest priority to the areas at highest risk⁸⁴.

The Neagh Bann (UKGBNIIENB) FRMP provided a detailed breakdown of the costs within the measure aspects, which included:

- Prevention: costs of Rivers Agency's liaison with planning authorities regarding new development: these are the estimated costs for the provision of flood risk management advice to the government and local councils;
- Protection: costs of measures in Rivers Agency's Capital Works Programme; costs associated with Rivers Agency's proposed operation of the Homeowner Flood Protection Grant Scheme; costs associated with Stakeholder Groups formed to address the requirements of the FD; costs associated with drainage maintenance; costs associated with drainage and flood risk management activities by "Transport Northern Ireland"; costs associated with drainage and flood risk management activities by "Northern Ireland Water"; costs associated with drainage and flood risk management activities in the Northern Ireland Department of Regional Development (DRD) 'Living with Water' Programme;
- Preparedness: costs associated with Rivers Agency's provision of Emergency Planning Expertise, Flood Warning, Informing and Awareness activities⁸⁵.

4.2 Funding of measures

Measures are proposed to be funded as follows:

- The Neagh Bann (UKGBNIIENB) FRMP mentions funding sources, which include: the Rivers Agency of Northern Ireland, Transport Northern Ireland and Northern Ireland Water⁸⁶. A Homeowner Flood Protection Grant Scheme was planned to be introduced by the regional government, which would improve the ability of householders and communities to enhance their property's resistance to flooding through the provision of individual property protection measures (operated by the Rivers Agency).

⁸³ UK09 FRMP Glossary: "Organisations that have a key role in flood and coastal erosion risk management as defined by the Act. These are the Environment Agency, Natural Resources Wales, lead local flood authorities, district councils where there is no unitary authority, internal drainage boards, water companies, and highways authorities."

⁸⁴ UKGBNIIENB FRMP, p.289; Clyde and Loch Lomond LFRMP (UK01), p.6; UK09 FRMP, Part A, p.8 and UK02 (Solway Tweed - English part) FRMP, Part A, p.16.

⁸⁵ UKGBNIIENB FRMP, pp.283-289.

⁸⁶ UKNI subsequently highlighted it may not be possible to guarantee funding over FRMP timeframe. For flood alleviation schemes for example, detailed assessments are required at feasibility stage before funding can be secured. NI FRMPs were developed at a strategic level so for many proposed measures in the FRMPs, full benefit cost assessments would not have been done.

- For Clyde and Loch Lomond (in UK01, Scotland), the FRMP describes key funding streams. Local authorities receive a funding settlement from the Scottish Government. Local authorities may then contribute funding to jointly deliver actions with partners such as National Park Authorities, Scottish Water, other Local Authorities, infrastructure providers and many others. A joint initiative between SEPA and the Met Office receives funding from the UK Government. Private investment also comes from Scottish Water for its own actions.
- For Solway (in the Scottish part of UK02), the Flood Risk Management Plan also notes that local authorities and the Scottish EPA receive a funding settlement from the Scottish Government. Private investment also comes from Scottish Water and Network Rail.
- For the Severn (UK09) FRMP, measures carried out by Risk Management Authorities are funded by the Department of Environment Food and Rural Affairs (DEFRA) in England and by the Welsh Government in Wales. Similarly, the funding in Solway Tweed (UK02 - English part) comes from DEFRA⁸⁷.

This information is summarised in the following table.

Table 7 ***Funding of measures***

	UK01 C&LL	UK02 Solway	UK02 Solway Tweed	UK09 Severn	UKGBNIIENB
Distribution of costs among those groups affected by flooding					✓
Use of public budget (national level)	✓	✓	✓	✓	
Use of public budget (regional level)	✓	✓		✓	✓
Use of public budget (local level)	✓	✓			
Private investment	✓	✓			
EU funds (generic)					
EU Structural funds					
EU Solidarity Fund					
EU Cohesion funds					
EU CAP funds					
International funds					
Local action groups	✓				

Source: FRMPs

⁸⁷ UKGBNIIENB FRMP, p.268, 283-289; Clyde and Loch Lomond LFRMP (UK01), pp.28-30; Solway LFRMP (UK02 Scottish part), p.11; UK09 FRMP, Part A, p.8

4.3 Measurable and specific (including location) measures

Only some of the FRMPs assessed include a clear and explicit description of the measures with regard to:

- What they are trying to achieve,
- Where they are to be achieved,
- How they are to be achieved, and
- By when they are expected to be achieved.

In the Neagh Bann (UKGBNIIENB) FRMP in Northern Ireland, measures for flood risk areas are described in general terms under the headings of preparedness, prevention and protection. The information provided is not sufficient to be measurable and no indicators are set out⁸⁸. The measures are listed in an appendix against the FRMP's objectives⁸⁹.

In the FRMPs for Severn (UK09) and Solway Tweed (UK02 - English part) FRMPs in England, the measures are listed at a UoM level and catchment level. There is a brief description of the measures and timeline which generally links to the planning cycle. The responsible parties for the measures are identified. There is no linkage to specific objectives, just to the three broad categories of objectives (as noted in section 3, three broad categories for objectives are given: environmental, economic or social)⁹⁰.

In the Scottish strategies assessed (Clyde and Loch Lomond in UK01 and Solway in UK02), measures or actions are linked to the objectives. Each action has an indicative delivery timescale. There are indicators identified with the Potentially Vulnerable Areas, which are linked to the measures via the objective identifier code. The responsible bodies for individual measures (referred to as delivery leads) are identified and overview descriptions of how they will be achieved are provided.

For each UoM the measures are specific to a geographical area, as summarised below:

Table 8 *Location of measures*

	UK01 C&LL	UK02 Solway	UK02 Solway Tweed	UK09 Severn	UKGBNIIENB
International					
National					

⁸⁸ NI subsequently clarified that there was an additional document produced called "Summary of measures in Northern Ireland flood risk management plans" available on the departmental website at: <https://www.infrastructure-ni.gov.uk/publications/flood-risk-management-plans>.

⁸⁹ UKGBNIIENB FRMP, Appendix H.

⁹⁰ UK09 Severn and UK02 Solway Tweed (English part), Part C, Annex 1.

	UK01 C&LL	UK02 Solway	UK02 Solway Tweed	UK09 Severn	UKGBNIIENB
RBD/UoM			✓	✓	
Sub-basin			✓		
APSFR or other specific risk area	✓	✓		✓	✓
Water body level					✓
Local Plan District areas	✓	✓			
LLFA areas			✓	✓	

Source: FRMPs

The Neagh Bann (UKGBNIIENB) FRMP has nine Significant Flood Risk Areas (SFRAs) where the measures have been defined to specific geographical areas and water bodies are named. There are also seven different types of regional measures e.g. Rivers Agency Watercourse Inspection and Maintenance, which are not specific to a geographic location.

In the FRMPs for the Severn (UK09) and Solway Tweed (UK02 English part), many measures are specific to a catchment or smaller areas such as Lead Local Flood Authorities (LLFA) areas or defined key communities. There are some actions which apply across the whole Severn RBD.

In the strategies for Clyde and Loch Lomond (in UK01) and Solway (in UK02, Scottish part), measures referred to as actions, are specific to areas at different scales. There are measures for the Local Plan District areas and measures specific to the Potentially Vulnerable Areas within them⁹¹.

4.4 Measures and objectives

In its reporting sheets, the UK indicated 2 299 different objectives for the UoMs in the reporting sheets, for 6 079 different measures. It has not been possible to aggregate this information.

All the FRMPs assessed link their measures to their objectives. The best example is in the Neagh Bann (UKGBNIIENB) FRMP, where the detailed objectives have been linked to the measures. This is done in a matrix style where a few objectives can be linked to a few different measures. In the Scottish strategies the objectives are also linked with the measures both descriptively and with referencing. For all other FRMPs assessed, the measures were only linked with the general objectives. However, there is no information on how and by how much the measures will contribute to the objectives, or that the objectives will be achieved by a

⁹¹ UKGBNIIENB FRMP, p.273; UK09 FRMP and UK02 FRMP (English part), Part B, p.76, p.19, p.37; UK01 Solway and Clyde and Loch Lomond FRMS, p.20.

certain set of measures. In the UK reporting sheets, the measures are reported against objectives for some of the Solway Tweed (UK02, English part) measures and Severn (UK09) measures and for all of the Neagh Bann (UKGBNIIENB) measures⁹².

4.5 Geographic coverage/scale of measures

In its reporting sheets, the UK has reported the location of measures for the majority of measures. For the Solway Tweed (UK02, English part), Severn (UK09) and Neagh Bann (UKGBNIIENB), the level of location ranges from RBD, WFD catchments, flood risk areas, to local areas or specific place names. In the reporting, location is not provided for measures in the strategy for Clyde and Loch Lomond (in UK01), and information for some measures in the Severn (UK09) is missing.

The UK reported information about the geographic coverage of all measures. This has been classified into the following categories: APSFR; Catchment; UoM; Lead Local Flood Authority (LLFA) Area; Local including towns/cities/boroughs/communities and other local areas; Strategic place; and Other for information that could not be categorised. Across all 15 UoMs reported the geographic coverage for almost one-third of measures is at APSFR level (3 076 out of 9 888 measures, 31 %), followed by local areas (2 493 measures, 25 %). The coverage of 1 471 measures is the LLFA area (15 %), that of 1 162 is the catchment area (12 %), and 370 measures (4 %), the UoM. Finally, 172 measures have a coverage of a strategic place (2 %), and the coverage of 1 144 measures appears falls into the “other” category (12 %).

Preparedness and prevention measures are mainly attributed to APSFR, and protection measures mainly have a coverage of local areas⁹³.

For more details see Tables A7 and A8 in Annex A.

4.6 Prioritisation of measures

Across all UoMs, the UK reported information to WISE about the priority of 6 117 measures (62 % of the total). The majority of the measures reported are categorised as of either moderate priority (2 524 measures out of the 6 117, 41 % of the total) and high (2 265 measures, 37 %) priority, especially for prevention and protection measures.

The Humber (UK04) UoM has the highest proportion of critical priority measures of all UoMs (91). The Humber (UK04) also has the most very high priority measures (189), followed by the Thames UoM, UK06 (128). For the Neagh Bann (UKGBNIIENB) UoM, there are no measures with very high or critical priorities.

⁹² FRMP documents; reporting sheets “Measure details: objectives”.

⁹³ Reporting sheets ‘Measure details: names and location’.

The category of priority was not reported for the Scotland UoM (UK01) or the Western Wales UoM (UK10); a high proportion were not reported for Solway Tweed (UK02, including both Scottish and English parts): (88 % of measures in this UoM). This is the case also for the Severn UoM, UK09 (50 %), and the Dee UoM, UK11 (76 %) ⁹⁴. For further details see Tables A9 and A10 in Annex A. For measures where the priority was not reported, the UK reported the timetable of implementation (see next page).

In some cases, the FRMPs provide further information on priorities: although priorities for measures were not reported to WISE for the Scotland UoM (UK01), national and local priority rankings are provided in the Scottish FRM Strategies.

The FRMPs assessed and the reporting sheets provide information on how priorities were set.

In the Neagh Bann (UKGBNIIENB) FRMP, there is no methodology section ⁹⁵. For each flood risk area, however, there is an overview of the flooding history, identification of potentially significant flood sources, and a flood risk assessment. Then the flood mitigation measures are proposed. Each scheme on the Department's Capital Works Programme is assessed against the four criteria ⁹⁶: degree of protection / risk of failure, economics, special consideration and financial control. A score was assigned to each scheme and the criteria are then weighted and scored to determine the final priority score of each individual scheme.

The Severn (UK09) FRMP details how prioritisation is done for measures in Wales, but not those in England. In Wales, prioritisation is carried out for all measures across UoM, taking into account the risk calculation from the Communities at Risk Register, a tool that considers a number of factors to give an indication of where the most vulnerable communities at risk of flooding from main rivers and the sea are located across Wales. Other factors such as cost-benefit analysis are also considered (see section 6 for further details).

In England, Risk Management Authorities (RMAs) prioritise public investment in flood and coastal risk management works based on DEFRA policy and Environment Agency guidance. No methodology is provided in the FRMPs assessed and there are no links to external guidance or methodologies.

The Scottish strategies do not provide the methodology for how measures have been prioritised. The strategies note that prioritisation was based on funding assumptions about the funds that can be provided by the Scottish Government and the capacity of local authorities to

⁹⁴ Reporting sheets.

⁹⁵ UKNI subsequently stated that methodologies for prioritisation of schemes and community resilience engagement are available, but not included in the FRMPs.

⁹⁶ Section 7.1.4.1 of the FRMP.

deliver⁹⁷. In the reporting sheets, it is explained that to prioritise measures, SEPA considered the following criteria: flood risk, technical complexity, potential economic benefit, and non-monetary impacts on the community and the environment. In addition, local authorities provided additional evidence and identified local factors that might alter the order of delivery.

The UK provided information about the timetable of all measures in its reporting sheets. The majority of the measures (5 558, 56 % of the total) are due to be implemented in the period 2015-2021, with protection measures most frequently (1 942) within this time frame, closely followed by prevention and preparedness measures. The second period reported most frequently is 2010-2045, with 1 813 measures in total (18 % of the total), most of which are preparedness measures. A significant proportion of the measures have been implemented before 2015 (763, 8 % of the total), especially for the Anglian UoM, UK05 (412 measures), and the Thames UoM, UK06 (173). In the Clyde and Loch Lomond UoM, UK01, and the Solway UoM (UK02 – Scottish part) the majority of measures are indicated for the period 2010-2045⁹⁸. For details, see Tables A11 and A12 in Annex A.

4.7 Authorities responsible for implementation of measures

In the reporting sheets, the UK gives information about the level of responsible authority for 8 746 measures (around 88 % of all measures), 1 142 being left with no information. The largest share of the measures reported are the responsibility of the Environment Agency (3 458 measures out of 8 746, 40 %), which is responsible for flood management in England, with the main focus being protection measures. The second largest responsibility is with the local authorities, again with their main focus on protection measures. The Lead Local Flood Areas are responsible for the majority of recovery and review measures. The smallest number of measures (263 measures, 3 %) are assigned to the ‘individual’ level of responsibility. For further details see Tables A13 and A14 in Annex A.

4.8 Progress of implementation of measures

In the reporting sheets, the UK gives information about the progress of implementation for all measures. The majority of measures are classified as ongoing (5 674 out of 9 888, 57 %), followed by those not started (3 870, 39 %). Across the UK, 90 measures (1 %) were reported to be undergoing construction and 254 (3 %) have been completed. For further details see Tables A15 and A16 in Annex A.

⁹⁷ UK02 Solway (Scottish part) FRMS, p.3, p.10, p.374.

⁹⁸ Reporting sheets.

4.9 Measures taken under other Community Acts

Member States were asked to report on other Community Acts under which each measure has been implemented: the UK did not, however, report on this. Nor did the FRMPs provide information on measures taken under other Community Acts.

4.10 Specific groups of measures

With regard to **spatial planning/land use measures**, measures are indicated in four of the five FRMPs assessed:

- For both the Solway Tweed (UK02, English part) and Severn (UK09) UoMs, measures under types M21 (preventing new receptors)⁹⁹ and M22 (removing receptors)¹⁰⁰ are reported. Measures under the M21 category for the Severn include: “Work with others to avoid inappropriate development”, which is the responsibility of the Environment Agency. No details could be found on M22 measures in the Severn FRMP or spatial planning and land use measures in the Solway Tweed FRMP.
- For the Scotland UoM (UK01), 215 M21 measures are reported. Both FRMPs assessed, Clyde and Loch Lomond (in UK01) and Solway (in UK02) contain measures for spatial planning. Separately, the local strategies each have an annex which details the measures at a national level under land use planning policies¹⁰¹.

In the Neagh Bann (UKGBNIIENB) UoM in Northern Ireland, no spatial planning or land use measures are identified in the reporting sheets. However, in the FRMP it is highlighted that planning and flood risk is a regional prevention measure and that a new planning policy statement was adopted which encourages a precautionary approach to development, with the aim of preventing development that may be at risk of flooding or that may increase the risk. The reporting sheets also highlight that Northern Ireland has had strict planning policies in place to prevent inappropriate development that may increase the risk of flooding since the introduction of a planning policy statement, “Planning and Flood Risk” in 2006: the continued strict application of the planning policy and the new policy are expected to prevent increased flood risk from new developments in the future.¹⁰²

There is no information whether the spatial planning framework has evolved since 2000.

⁹⁹ Measures to prevent the location of new or additional receptors in flood prone areas, such as land use planning policies or regulation.

¹⁰⁰ Measures to remove receptors from flood prone areas, or to relocate receptors to areas of lower probability of flooding and/or of lower hazard.

¹⁰¹ UK02 Solway Tweed FRMP, Part C; UK09 FRMP, Part C; UK01 FRMS, Annex 2.

¹⁰² NI noted subsequently that Northern Ireland has taken a very strong approach to development planning and flood risk since the 1970s.

Natural water retention measures (NWRMs) have been planned in some, but not all, of the five FRMPs assessed.

In the Neagh Bann (UKGBNIIENB) FRMP, there is information on natural flood risk management measures that will be considered in the options appraisals for the flood studies. Proposed measure may include upstream flood storage, removal of existing flood banks to reconnect rivers with their natural flood plains (N03¹⁰³), removing existing culverts to restore natural river channels and the creation of wider and more environmentally sensitive two-stage channels (N08¹⁰⁴).

One of the Welsh national measures is to “seek opportunities and influence others to utilise natural flood risk management measures where appropriate.” Many of the measures identified in the Severn (UK09) FRMP involve natural flood management and runoff and catchment management (M31 type measures). Among other actions, sustainable urban drainage systems (SuDS) protocols are promoted. No natural flood management measures have been found in the Solway Tweed FRMP (UK02, English part).

For Clyde and Loch Lomond (in UK01), the strategy reports that natural flood management actions were recommended in areas where they could contribute to the management of flood risk. Natural flood management studies (i.e. pilot studies) have been identified for three potentially vulnerable areas¹⁰⁵. There are also some measures which involve implementation, such as “Native woodland planting in the upper catchment...The woodland will help to slow and reduce runoff into the river which could reduce the impact from high likelihood flooding.”¹⁰⁶ Natural flood risk management studies have also been proposed for Solway (in UK02), such as a study to reduce the risk of river flooding to residential and non-residential properties in Ecclefechan.

Measures that specifically consider nature conservation. All five FRMPs assessed refer to biodiversity and coordination with biodiversity authorities or partnerships. The Neagh Bann (UKGBNIIENB) FRMP refers to the protection of priority species and habitats in one of the environmental objectives. In the Solway Tweed FRMP (UK02, English part), a coastal process and strategy study is recommended to consider the internationally designated sites in Moricambe Bay in the managed realignment of flood defences. In the Clyde and Loch Lomond (in UK01) strategy, biodiversity and habitats are mentioned in the section of the measure descriptions which summarises the environmental impacts¹⁰⁷.

¹⁰³ According to the categories in Annex B, N03 NWRM is: Floodplain restoration and management.

¹⁰⁴ According to the categories in Annex B, N08 NWRM is: Riverbed material renaturalisation.

¹⁰⁵ UKGBNIIENB FRMP, p.29; UK01 FRMP, Part B, p.17, Part C; UK01 FRMS, p.3, p.20.

¹⁰⁶ UK01 Clyde and Loch Lomond FRMP, p.31.

¹⁰⁷ UKGBNIIENB FRMP, p.333; UK09 FRMP Part B p.27; UK02 FRMP (English part) Part B p.27.

The only FRMP that appears to consider **navigation and port infrastructure** in the consideration of measures is the Solway Tweed (UK02, English part), with the measure “Promote a flood risk and coastal adaptation study for Port Carlisle and access road to raise awareness and encourage individual property flood defences if appropriate”¹⁰⁸.

No reference has been found in the five FRMPs assessed to **dredging** to increase the river channel capacity and its ability to convey water for flood alleviation purposes.

4.11 Recovery from and resilience to flooding

The role of insurance policies is discussed in two of the five FRMPs assessed, with regard to the recovery from flooding, preparedness/resilience to flood or other issues. The Neagh Bann (UKGBNIIENB) FRMP includes a measure “to work with the insurance industry to assist them in introducing ‘FloodRe’ to Northern Ireland to help address long term flood insurance affordability issues.” The Severn (UK09) FRMP includes measures to help the insurance industry to be prepared by understanding the flood risk assessments and to improve communications with the insurance industry¹⁰⁹. The other three FRMPs assessed do not include measures relating to insurance policies.

The five FRMPs assessed do not provide information about the types of insurance currently available for potential flooding areas.

The Neagh Bann FRMP includes a measure with another type of economic instrument: A Homeowner Flood Protection Grant Scheme. This is intended to improve the ability of householders and communities to enhance the resistance of property to flooding, through the provision of individual property protection measures (this would be operated by the Rivers Agency).

4.12 Monitoring progress in implementing the FRMP

The Neagh Bann (UKGBNIIENB) FRMP states that progress will be monitored annually and reported to the European Commission. In the Scottish strategies, it is stated that the lead local authorities will provide an interim report on the progress of delivering the measures between two and three years after its publication, and a final report will be prepared at the end of the first planning cycle. In the FRMPs for Solway Tweed (UK02, English part) and Severn (UK09), it is stated that in England, the Environment Agency will report progress annually to

¹⁰⁸ FRMP Part C Page 7.

¹⁰⁹ UK09 FRMP Part C.

the relevant Regional Flood and Coastal Committees; the Environment Agency and Natural Resources Wales will review the FRMP every six years¹¹⁰.

A baseline does not appear to have been set in the FRMPs assessed from which progress could be monitored. However, in the Scottish strategies the appraisal baseline is defined as “the existing level of flood risk under the current flood risk management regime”¹¹¹.

4.13 Coordination with the Water Framework Directive

The table below shows how the development of the FRMPs has been coordinated with the development of the second RBMPs under the WFD.

Table 9 *Coordination of the development of the FRMPs with the development of the second River Basin Management Plans of the WFD*

FRMPs	UKGBNII ENB	UK01 C&LL	UK09 Severn	UK02 Solway Tweed	UK02 Solway
Integration of FRMP and RBMP into a single document					
Joint consultation of draft FRMP and RBMP		✓			✓
Coordination between authorities responsible for developing FRMP and RBMP	✓	✓	✓	✓	✓
Coordination with the environmental objectives in Art. 4 of the WFD			✓	✓	
The objectives of the FD were considered in the preparation of the RBMPs ^a	✓	✓	✓	✓	✓
Planning of win-win and no-regret measures in the FRMP					
The RBMP Programme of Measures includes win-win measures in terms of achieving the objectives of the WFD and FD, drought management and NWRMs ^a	✓	✓	✓	✓	✓
Permitting or consenting of flood risk activities (e.g. dredging, flood defence maintenance or construction) requires prior consideration of WFD objectives and RBMPs					

¹¹⁰ UKGBNIIENB FRMP p. 293; UK01 FRMSs p. 10; UK09 FRMP, Part A p.65.

¹¹¹ UK02 Solway Scottish Part, P.363. SEPA further clarified that the current objective indicators, and national risk figures have been included in all FRM strategies, providing a baseline.

FRMPs	UKGBNII ENB	UK01 C&LL	UK09 Severn	UK02 Solway Tweed	UK02 Solway
Natural water retention and green infrastructure measures have been included		✓	✓		✓
Consistent and compliant application of WFD Article 7 and designation of heavily modified water bodies with measures taken under the FD e.g. flood defence infrastructure					
The design of new and existing structural measures, such as flood defences, storage dams and tidal barriers, have been adapted to take into account WFD Environmental Objectives ^a		✓			
The use of sustainable drainage systems, such as the construction of wetland and porous pavements, have been considered to reduce urban flooding and also to contribute to the achievement of WFD Environmental Objectives ¹¹²	✓	✓	✓		✓

Notes: ^a based on reporting under the WFD

The FRMPs assessed refer to the necessity of coordination between the FRMPs and RBMPs, and the obligation to foster the achievement of the WFD objectives, which often leads to the selection of sustainable solutions, like NWRMs including SuDS. NWRMs measures and SuDs measures are proposed in some but not all of the FRMPs. The boundaries of the UoMs match those of the RBDs, and the same catchment (sub-basin) boundaries are utilised in the FRMPs as well as the RBMPs.

In the Neagh Bann (UKGBNIIENB) FRMP, it is reported that there is continued engagement between the Rivers Agency for Northern Ireland, the competent authority for the FD and Northern Ireland Environment Agency (NIEA), the competent authority for the WFD, through an interdepartmental steering group and local Flood Forums. In addition, this FRMP has an objective “To support the objectives of the WFD and contribute to the achievement of good ecological potential/status for water bodies”.

¹¹² SEPA clarified subsequently that this is covered by the Surface Water Management Plan Actions (glossary definition “A plan that takes an integrated approach to drainage accounting for all aspects of urban drainage systems and produces long term and sustainable actions. The aim is to ensure that during a flood the flows created can be managed in a way that will cause minimum harm to people, buildings, the environment and business.”)

In the Severn (UK09) FRMP, it is reported that the Environment Agency and Natural Resources Wales lead on the development of both FRMPs and RBMPs. The FRMP measures are linked to RBMP and the WFD objectives, so that, according to the FRMP, the Environment Agency and Natural Resources Wales know where flood risk projects contribute to environment outcomes. The WFD was also considered in the objective setting in Severn (UK09) and Solway Tweed (UK02, English part) FRMPs.

In the Clyde and Loch Lomond (UK01) and Solway (UK02, Scottish part) strategies, it is reported that the Scottish EPA is leading the delivery of the RBMPs and the Flood Risk Management Strategies and has worked to ensure integration and coordination between them¹¹³.

The UK has associated the measures in the FRMPs to the Key Type of Measures (KTM) of the RBMPs. KTM codes are provided for three UoMs (UK09 – Severn, UK10 - Western Wales, and UK11 – Dee). For UK09, measures under the following KTM codes are indicated:

- KTM6 – Improving hydromorphological conditions of water bodies other than longitudinal continuity
- KTM7 – Improvements in flow regime and/or establishment of ecological flows
- KTM14 – Research, improvement of knowledge base reducing uncertainty
- KTM23 – Natural water retention measures

4.14 Good practices and areas for further development with regard to measures

The following **good practices** were identified:

- Measures are clear in terms of their geographic location and coverage, responsible authority, general timetable.
- Promotion of sustainable land use practices and natural flood risk management has been planned in all of the FRMPs.
- In some of the FRMPs, economic instruments for flood risk management such as insurance has been supported.
- There is evidence of coordination between the FRMPs and the RBMPs for all of the UoMs assessed.
- The UK provides cost estimations for a large number of measures across all of its UoMs in the reporting sheets.

¹¹³ UKGBNIIENB FRMP, p.21, p.31; UK09 FRMP Part A p.15, p.57; UK02 FRMP (English part) Part A p.75; UK01 FRMS, p.8.

The following **areas for further development** were identified:

- The method to demonstrate by how much a measure will contribute to the objectives is unclear or lacking. For example, a baseline has not been established for all FRMPs (Scottish FRM strategies were the exception), against which progress will be monitored and assessed.
- It is unclear how measures were prioritised in the English FRMPs.
- The overall budget per UoM is not provided for the UoMs assessed, with the exception of the UKGBNIIENB FRMP¹¹⁴. A significant proportion of the total measures across all UoMs in the United Kingdom did not have reported costs (38 %). It is indicated that in the FRMPs that measures do not all have secured funding and are not guaranteed to be implemented.

¹¹⁴ Reporting costs in the Scottish strategies are presented separately in the Local FRMPs

5. Consideration of climate change

Climate change was considered in all five FRMPs assessed.

Only one of the five FRMPs assessed refer to a national Climate Change Adaptation Strategy. In Northern Ireland, the FRMP for Neagh Bann (UKGBNIIENB) refers to the Northern Ireland Climate Change Adaptation Programme¹¹⁵, published early in 2014, in their FRMP and provides links, however these no longer work. No reference was found in the Scottish strategies assessed, for Clyde and Loch Lomond (in UK01) and Solway (in the Scottish part of UK02). The other two FRMPs assessed (Solway Tweed, UK02, and Severn, UK09) discuss climate change adaptation but have not made specific reference to a national Climate Change Adaptation Strategy in their FRMPs¹¹⁶.

All five FRMPs consider climate change scenarios, though the timeframes vary across the UK. In Northern Ireland, climate change flood hazard maps illustrate the estimated flood plains for the years 2030 and 2100 and are based on the best available predictions for the meteorological conditions and sea levels for that time. The Scottish strategies and the FRMPs for the English part of the Solway Tweed (UK02) and for the Severn (UK09) refer to a 2080 scenario from the UK Climate Projections (UKCP09) and the UK Climate Impacts Programme (UKCIP) respectively. The FRMP for the Solway Tweed (UK02, English part) provides further detail, considering scenarios from 1990 to 2025, 2026 to 2050, 2051 to 2080 and 2081 to 2115¹¹⁷.

All strategies assessed refer to an increase in heavy rain or greater extremes in weather which may lead to more frequent and severe flooding in the future, but no information is provided in relation to changes in numerical recurrence times. No detail was found in the FRMPs assessed how the main sources of flooding are expected to change under long term climate change scenarios.

5.1 Specific measures to address expected effects of climate change

Measures related to climate change are described in the FRMPs for England: the Solway Tweed (English part of UK02) and Severn (UK09) strategies assessed mention incorporating allowances for climate change into flood risk management works and identifying where working with natural processes can help improve resilience to climate change. In Northern Ireland, the Neagh Bann (UKGBNIIENB) FRMP states that preventative measures take account of climate change. The Scottish strategies assessed (Clyde and Loch Lomond in UK01

¹¹⁵ Department of Environment (2014) Northern Ireland Climate Change Adaptation Programme: <https://www.daera-ni.gov.uk/publications/northern-ireland-climate-change-adaptation-programme>

¹¹⁶ UKGBNIIENB – FRMP page 41; UK02 FRMP Part A Page 38.

¹¹⁷ UKGBNIIENB – Summary document and FRMP (p.59); UK01 and UK02 (Scotland) – FRMS; UK02 (England) – FRMP Part A p. 39; UK09 - FRMP Part A.

and Solway in UK02) refer to measures to study flood risk and any changes in the future due to climate change¹¹⁸.

Climate change was not explicitly indicated for other measures in the FRMPs assessed. For instance, there is no information to suggest that climate change was considered with regard to measures to reduce pollution risk in flood prone areas, spatial planning or land use measures.

Reference to the consideration of climate change in economic instruments was not found for the majority of the FRMPs assessed. However, the Severn FRMP (UK09) refers to a measure that involves working with the insurance industry to make the best use of risk information under a changing climate. As mentioned in section 4, the Neagh Bann (UKGBNIIENB) FRMP includes a measure “to work with the insurance industry to assist them in introducing ‘FloodRe’ to Northern Ireland to help address long term flood insurance affordability issues”¹¹⁹.

The majority of the FRMPs assessed do not mention climate change with regard to structural measures. The Severn FRMP (UK09), however, includes measures that incorporate climate change into flood risk management works such as including additional provision during design and construction to address climate change (e.g. larger wall foundations). In addition, several UK09 measures refer to raising defences in certain areas in response to climate change. The measures in this FRMP also include identifying where working with natural processes can help improve resilience to climate change¹²⁰. While this may be a no-regret measure, neither this nor the other FRMPs assessed refer specifically to ‘no-regret’ measures.

One of the five FRMPs assessed mentions climate change as an argument for increased operational measures associated with existing flood defences: the Severn FRMP (UK09) includes measures that incorporate climate change implications in areas including culvert inspection, asset maintenance regimes and raising outfalls¹²¹.

5.2 Good practices and areas for further development concerning climate change

The following **good practices** were identified:

- All five FRMPs consider climate change scenarios, though the timeframes vary across the UK.

¹¹⁸ UK02 (England) and UK09 - FRMPs part C; UKGBNIIENB – FRMP section 3.2.1; UK01 and UK02 (Scotland) – FRMS, Section 2.

¹¹⁹ UK09 – FRMP Part C page 54 and 80.

¹²⁰ UK09 FRMP – Part C p.10.

¹²¹ UK09 – FRMP Part C. Page 66, 104.

- The development of further studies to identify the effects of climate change is part of the measures planned in some of the FRMPs assessed.

The following **area for further development** was identified:

- Even though different climate change scenarios were considered, the FRMPs do not provide details on possible shifts in the occurrence of extreme events and changes in numerical recurrence times or whether the main sources of flooding will change under the long-term climate change scenarios.
- Coordination between FRMPs and the climate change adaptation strategies does not appear to be systematic.

6. Cost-benefit analysis

Cost-benefit analysis (CBA) appears to have been used in the prioritisation and planning of measures for some of the FRMPs assessed, but only limited details are provided:

- In the Neagh Bann (UKGBNIIENB) FRMP, it is briefly mentioned that maintenance and capital programmes are evaluated using cost-benefit criteria prior to inclusion in the annual works programme; further information is not provided.
- For Wales, the FRMP for the Severn, UK09, explains that the prioritisation of measures is done at a Wales-wide level and considers CBA. It is also stated that all large flood alleviation schemes in Wales are appraised to assess options and to understand the costs and benefits, which is done in accordance with Treasury guidance.
- For England, it is not clear if CBA was used (UK02 Solway Tweed and UK09 Severn – English parts): no methodology is provided in the FRMPs and there are no links to external guidance or methodologies.
- The Scottish reporting sheets explain that measures were prioritised based on criteria that includes potential economic benefits, and non-monetary impacts on the community and the environment. It is noted in the Scottish strategies that the measures have been appraised for their costs and benefits to ensure the right combinations of measures are identified and prioritised. The Benefit Cost Ratio is reported for some schemes in the FRM strategies¹²². Further detail is said to be found in the Strategic Appraisal Methodology on the SEPA website. However, no link is provided and the methodology could not be found^{123 124}.

It is unclear from the FRMPs assessed for which types of measures CBA has been used. Multiple benefits are mentioned as a concept in two of the FRMPs assessed, but there is no information on how it has been implemented or if it has been included in CBA: for example, in the Neagh Bann (UKGBNIIENB) FRMP, multiple benefits and partnership working/funding for the implementation of natural flood management measures is highlighted; the Severn (UK09) FRMP states that actions under its framework should provide multiple benefits.

¹²² The Benefit Cost Ratio (BCR) is defined as “A benefit cost ratio summarises the overall value for money of an action or project. It is expressed as the ratio of benefits to costs (both expressed as present value monetary values). A ratio of greater than 1:1 indicates that the economic benefits associated with an action are greater than the economic costs of implementation; therefore this is taken as the threshold of economic viability. It should be acknowledged that it is not always possible to accurately estimate economic values for all elements of benefit, and BCR is just one a number of techniques used in appraisal.” UK02 Solway Scottish part, p. 363.

¹²³ UKGBNIIENB FRMP p. 273; UK09 FRMP p.14; UK02 Solway FRMS p.3, p.374.

¹²⁴ SEPA subsequently clarified that the document was previously available but was taken down as second cycle approaches were developed, and it ceased to be current or representative.

The Neagh Bann UoM (UKGBNIIENB) is an international UoM shared with the Republic of Ireland. However, no information was found in the FRMP whether a CBA was used to assess measures with transnational effects.

6.1 Good practices and areas for further development

The following **area for further development** was identified:

- For the FRMPs in England, Wales and Northern Ireland, there is no explanation of what is included in the cost benefit analysis and for what measures it was undertaken for¹²⁵.

¹²⁵ UKNI subsequently stated that NI FRMPs were developed at a strategic level so for many proposed measures in the FRMPs, full benefit cost assessments would not have been done.

7. Governance including administrative arrangements, public information and consultation

7.1 Competent authorities

Based on the FRMPs and the information provided in the reporting sheets, the Competent Authorities and the Units of Management identified for the FD have not changed. The United Kingdom has not reported new information on Competent Authorities to WISE since 2010.

7.2 Public information and consultation

The table below shows how the public and interested parties were **informed** in the five FRMPs assessed concerning the draft FRMPs. Information on how the consultation was actually carried out and which stakeholders participated is presented in the rest of the section:

Table 10 *Methods used to inform the public and interested parties of the FRMPs*

	UKGBNIE NB	UK02 Solway	UK01 C&LL	UK02 Solway Tweed	UK09 Severn
Media (papers, TV, radio)	✓	✓	✓		
Internet	✓	✓	✓	✓	✓
Digital social networking		✓	✓	✓	✓
Printed material	✓	✓	✓		
Direct mailing					
Invitations to stakeholders	✓	✓	✓		
Local Authorities		✓	✓	✓	✓
Meetings				✓	✓

Source: FRMPs

The consultation in the five FRMPs assessed appears to have been carried out in a similar manner, using online webpages and engagement at a local level. The details of the means of informing public were as follows:

For Neagh Bann (UKGBNIE NB), local television, radio and newspapers were used, as well as direct invitations to stakeholders. Information about the consultation was advertised in newspapers as well as online, on the websites of DARD and Rivers Agency. The PFRAs were made available for public consideration and a publicity campaign was run over local television, radio and newspapers to make the public aware of flood maps¹²⁶.

¹²⁶ UKGBNIE NB - Flood Risk Management Plan Summary.

In the Scottish strategies, consultation was held through Local Advisory Groups and stakeholders were invited to provide advice. Advertisements were placed in a number of national and local publications, notices were placed on social media, and promotional materials and support were provided to local authorities for community events¹²⁷.

In England and Wales, the consultation was also held by local authorities and there was a dedicated webpage¹²⁸ for the consultation. The consultation was promoted through social media with a series of tweets at the launch, mid and end of the consultation period. An email was also sent out at the launch, during the middle and at the end of consultation to stakeholders to encourage them to respond to the consultations. The consultation was mentioned in various newsletters including the National Flood Forum¹²⁹ and a newsletter for Regional Flood and Coastal Committees (RFCCs)^{130 131}.

The table below shows how the actual **consultation** was carried out:

Table 11 *Methods used for the actual consultation*

	UKGBNIE NB	UK02 Solway	UK01 C&LL	UK02 Solway Tweed	UK09 Severn
Via Internet	✓	✓	✓	✓	✓
Digital social networking					
Direct invitation	✓	✓	✓	✓	✓
Exhibitions					
Workshops, seminars or conferences				✓	✓
Telephone surveys					
Direct involvement in drafting FRMP					

Source: FRMPs

The main mechanism for carrying out the actual consultation was via the internet and direct invitation for comments from stakeholders. In Northern Ireland, details of the consultation were advertised on DARD's website and stakeholders were invited to provide comments for a

¹²⁷ FRMS p.4; UK01 - Flood Risk Management Plan Summary.

¹²⁸ <https://www.gov.uk/government/consultations/draft-flood-risk-management-plans> and <https://naturalresources.wales/guidance-and-advice/environmental-topics/consultations/our-own-consultations-closed/consultation-on-draft-flood-risk-management-plans-for-wales/?lang=en>

¹²⁹ As an independent charity whose aim is to enable people to take control of their own flooding concerns. <https://nationalfloodforum.org.uk/>

¹³⁰ A committee established by the Environment Agency under the Flood and Water Management Act 2010 that brings together members appointed by Lead Local Flood Authorities (LLFAs) and independent members with relevant experience. The Environment Agency must consult with RFCCs about flood and coastal risk management work in their region and take their comments into consideration.

¹³¹ UK09 Severn - Flood Risk Management Plan Summary.

six-month consultation period (22 December 2014 - 22 June 2015). The timing of the consultation was coordinated with the Northern Ireland Environment Agency's public consultation on its second Draft RBMP under the WFD, to encourage and provide an efficient method for parties with a common interest in the objectives of both Directives.

In Scotland, the primary route for consultation was via an online hub that enabled the public to find information on flood risk management planning using a postcode search or interactive map. Paper copies of the draft documents were also made available. The consultation period lasted six months (December 2014 and June 2015).

In England and Wales, a three-month public consultation took place from 10 October 2014 until 31 January 2015. A wide range of engagement activities were carried out at a national level to promote the FRMP consultation. A number of workshops were held before and during the consultation period, with organisations from a range of sectors, to discuss the consultations. The consultation was on the agenda at a number of national meetings and events. In England several workshops covered both the RBMPs and the FRMPs (e.g. Modified waters workshop, National liaison panel workshop (also covering river basin management strategies assessed) and estuaries and coasts sub-group).

The table below shows how the **documents** for the consultation were provided:

Table 12 *Methods used to provide the documents for the consultation*

	UKGBNII ENB	UK02 Solway	UK01 C&LL	UK02 Solway Tweed	UK09 Severn
Downloadable	✓	✓	✓	✓	✓
Direct mailing (e-mail)					
Direct mailing (post)					
Paper copies distributed at exhibitions					
Paper copies available in municipal buildings (town hall, library etc.)	✓	✓	✓		
Paper copies at the main office of the competent authority					

Source: FRMPs

The main way documents were provided, was to make them available to download via the consultation webpages and printed copies were available on request. Paper copies do not appear to have been made available in the English and Welsh UoMs assessed.

7.3 Active involvement of Stakeholders

The table below shows the groups of **stakeholders** that have been actively involved in the development of the five FRMPs assessed:

Table 13 *Groups of stakeholders*

	UKGBNI IENB	UK02 Solway	UK01 C&LL	UK02 Solway Tweed	UK09 Severn
Civil Protection Authorities such as Government Departments responsible for emergency planning and coordination of response actions	✓	✓	✓		
Flood Warning / Defence Authorities	✓	✓	✓	✓	✓
Drainage Authorities	✓	✓	✓	✓	✓
Emergency services	✓				
Water supply and sanitation	✓	✓	✓	✓	✓
Agriculture / farmers	✓				
Energy / hydropower					
Navigation / ports	✓				
Fisheries / aquaculture	✓				
Private business (Industry, Commerce, Services)					
NGO's including nature protection, social issues (e.g. children, housing)	✓	✓	✓	✓	
Consumer Groups					
Local / Regional authorities	✓	✓	✓	✓	✓
Academia / Research Institutions					

Source: FRMPs

Not all the stakeholders consulted are listed in the English and Welsh FRMPs assessed, but the strategies assessed indicate that meetings were held with local groups (e.g. Local Authority Flood Risk Management Capacity Building Programme and the Local Government Association coastal special interest group) and with the water industry (e.g. water Industry sector workshop in 2015). The Neagh Bann (UKGBNIENB) FRMP contains a list of stakeholders consulted, which includes a range of governmental departments, NGOs, utilities, transport, agriculture and professional institutes (e.g. Institute of Civil Engineers). For Scotland, the stakeholders consulted were part of the Local Advisory Groups, which included

representatives from a range of sectors, including government agencies, local authorities, non-government organisations, utility companies and land and asset managers¹³².

The table below shows the **mechanisms** used to ensure the active involvement of stakeholders:

Table 14 *Mechanisms used to ensure the active involvement of stakeholders*

	UKGBNIIENB	UK02 Solway	UK01 C&LL	UK02 Solway Tweed	UK09 Severn
Regular exhibitions					
Establishment of advisory groups	✓	✓	✓	✓	✓
Involvement in drafting		✓	✓		
Emails and meetings					✓
Formation of alliances					

Source: FRMPs

In Northern Ireland, a consultation network was set up to ensure all relevant stakeholders had an opportunity to participate in discussion and exchange of information and views in the preparation of the FRMP. Within this network there were three main groups: a FD Steering Group, a FD Stakeholder Group, and Flood Forum groups for each RBD.

In the Scottish strategies assessed, it is described how two public consultations were held by SEPA, the first on a general approach to planning and the second held jointly with local authorities on understanding flooding in priority areas and the objectives needed to manage flooding. The Scottish Strategies have benefited from local advisory groups, which include representatives from a variety of sectors including government agencies, local authorities, NGO's, utility companies and land managers. There is also a cross border advisory group.

For England and Wales, the approach to promote the consultation locally was predominately via meetings with stakeholders. Natural Resources Wales and the Environment Agency also promoted the consultation locally through periodic Strategic Partnership meetings between July 2014 - January 2015, and through representation at the Regional Flood and Coastal Committee meetings¹³³.

¹³² UK01 Solway Tweed and UK09 Severn - FRMPs Summary; UKGBNIIENB FRMP, Appendix A; UK02 Solway and UK01 Clyde and Loch Lomond, FRMS p.4.

¹³³ UKGBNIIENB FRMP, Section 4.3, p.60; UK02 Solway and UK01 Clyde and Loch Lomond, FRMS p.4; UK01 Solway Tweed and UK09 Severn - FRMPs Summary.

7.4 Effects of consultation

The table below shows the **effects** of consultation:

Table 15 *Effects of consultation*

FRMP	UKGBN IENB	UK02 Solway	UK01 C&LL	UK09 Severn	UK02 Solway Tweed
Changes to selection of measures					
Adjustment to specific measures	✓				
Addition of new information	✓				
Changes to the methodology used					
Commitment to further research					
Commitment to action in the next FRMP cycle					
No information/details		✓	✓	✓	✓

Source: FRMPs

An overview of the changes made to the FRMPs assessed as a result of consultation is not consistently provided. One FRMP, for Neagh Bann (UKGBNIIENB), provides a summary of the changes in an appendix. Examples include:

- Plan objectives were revised to make it clear the cost of flood damage to infrastructure was included in the objective to reduce economic losses.
- The Plan was revised to ensure that the linkages between the various flood management groups and programmes were more clearly defined.
- The Plan was updated to include details of the current position in relation to potential contribution that NFM measures could make within the sustainable catchment based approach to flood risk management¹³⁴.
- The Plan was revised to ensure that all of the important elements and benefits of community emergency planning are more fully described.

For the ten English and Welsh FRMPs, a separate document with the responses to the consultation was produced that covered all UoMs, one for England¹³⁵ and one for Wales¹³⁶. A summary of the consultation responses covering the whole of Scotland was published¹³⁷.

¹³⁴ Appendix B of UKGBNIIENB FRMP.

¹³⁵ English consultation:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/501489/LIT_10408_draft_FRMPs_summary_response.pdf

¹³⁶ Welsh consultation - <http://naturalresources.wales/media/4408/dfrmp-consultation-response.pdf>

¹³⁷ Scottish consultation - https://www.sepa.org.uk/media/163414/consultation_digest.pdf

7.5 Strategic Environmental Assessment

All the FRMPs assessed underwent a strategic environmental assessment to assess significant environmental effects of the flood risk management measures. The Strategic Environmental Assessments were published in an environmental report and were consulted with the public.

7.6 Good practices and areas for further development regarding Governance

The following **good practices** were identified:

- Extensive coordination with local authorities and authorities from other departments (than those responsible for floods) was carried out in preparation of the FRMPs assessed, these included governmental departments, NGOs, utilities, transport, agriculture and professional institutes.
- In the five FRMPs assessed, mechanisms for the active involvement of stakeholders covered different levels (UoM level as well as that of catchments) and included a range of advisory groups.

Annex A: Supplementary tables and charts on measures

This Annex gives an overview of the data on measures provided by the UK in the reporting sheets. These tables and charts were used for the preparation of section 4 on measures.

Background & method

This document was produced as part of the assessment of the Flood Risk Management Strategies assessed (FRMPs). The tables and charts below are a summary of the data reported on measures by the Member States and were used by the Member State assessor to complete the questions on the Flood measures. The data are extracted from the XMLs (reporting sheets) reported by Member States for each FRMP, and are split into the following sections:

- **Measures overview** – Tabulates the number of measures for each UoM;
- **Measure details: cost** – Cost & Cost explanation;
- **Measures details: name & location** – Location & geographic coverage;
- **Measure details: authorities** – Name of responsible authority & level of responsibility;
- **Measure details: objectives** – Objectives, Category of priority & Timetable;
- **Measure details: progress** – Progress of implementation & Progress description;
- **Measure details: other** – Other Community Acts.

On the basis of the reporting guidance (which in turn is based on the FD)¹³⁸, not all fields are mandatory, and, as such, not all Member States reported information for all fields.

Some of the fields in the XMLs could be filled in using standardised answers – for example, progress is measured via the categories set out in the Reporting Guidance. This means that producing comprehensive tables and charts required little effort. For many fields, however, a free data format was used. For some Member States, this resulted in thousands of different answers, or answers given in the national language.

In such situations, tables and charts were developed using the following steps:

- A first filter is applied to identify how many different answers were given. If a high number of different answers are given, Member States assessors were asked to refer to the raw data when conducting the assessment, and this Annex does not reflect these observations.
- If a manageable number of answers are given, obvious categories are identified, and raw data sorted.

¹³⁸ <http://icm.eionet.europa.eu/schemas/dir200760ec/resources>

- Measures missing information may be assigned categories based on other fields (for example, if the level of Responsibility Authority is missing, the information may be obvious from the field “name of Responsible Authority”).
- Measures where obvious categories cannot be defined based on other available information (as in the example above on the name of the Responsible Authority), are categorised as “no information”.

Types of measures used in reporting

The following table¹³⁹ is used in the reporting on the types of measures. Each type of measures is coded as an M-number. Measures are grouped in an ‘aspect’.

NO ACTION M11: No Action	PREPAREDNESS M41: Flood Forecasting & Warning M42: Emergency response planning M43: Public Awareness M44: Other preparedness
PREVENTION M21: Avoidance M22: Removal or relocation M23: Reduction M24: Other prevention	RECOVERY & REVIEW M51: Clean-up, restoration & personal recovery M52: Environmental recovery M53: Other recovery
PROTECTION M31: Natural flood management M32: Flow regulation M33: Coastal and floodplain works M34: Surface Water Management M35: other protection	OTHER MEASURES M61: Other measures

¹³⁹ Guidance for Reporting under the FD (2007/60/EC):
<https://circabc.europa.eu/w/browse/a3c92123-1013-47ff-b832-16e1caaafc9a>

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Measures overview

Table A1 - Total number of measures

Number of individual measures	9 055
Number of individual measures including measures which have been allocated to more than one measure type	9 530
Number of aggregated measures	336
Number of aggregated measures including measures which have been allocated to more than one measure type	358
Total number of measures	9 391
Total number of measures including measures which have been allocated to more than one measure type	9 888
Range of number of measures between UoMs including measures which have been allocated to more than one measure type (Min-Max)	27 - 2 337
Average number of measures across UoMs including measures which have been allocated to more than one measure type	659

Table A2 - Number of individual measures per measure type and UoM

	No action	Prevention				Protection					Preparedness				Recovery & review			Other	Grand Total
	M11	M21	M22	M23	M24	M31	M32	M33	M34	M35	M41	M42	M43	M44	M51	M52	M53	M61	
UK01		215		2	444	4		98	211	300	369	224	470						2 337
UK02		40	1	7	76	3	2	16	10	65	75	40	90	10				5	440
UK03			2	11	18	24	12	28		9	2	14	12	29			3		164
UK04		110	16	61	137	17	35	217	28	80	44	23	83	53	8	7	10	6	935
UK05		35	21	47	287	140	21	126	59	191	22	38	61	51	1	7	6		1 113
UK06	36	132	29	252	181	81	33	100	77	86	74	95	183	147	10	7	26	43	1 592
UK07	5	1		7	12	5	3	105	19	5	8	9	4	19	7		11	6	226
UK08	1	28	4	20	76	57	17	220	33	56	50	24	49	26			9	19	689
UK09	1	58	2	63	315	34	16	87	38	69	132	19	123	68	3	2	6	8	1 044
UK10		1			104	2	3	15	1	65	142		25	5					363
UK11					13	1	2	4		19	28	2	18	3			1		91
UK12		4	6	16	13	57	15	102	45	58	16	10	30	107	1		2	4	486
UKGBNIIENB							1	21											22
UKGBNIIENW								13											13
UKGBNINE								11	3				1						15
Grand Total	43	624	81	486	1 676	425	160	1 163	524	1 003	962	498	1 149	518	30	23	74	91	9 530
Average per UoM	3	42	5	32	112	28	11	78	35	67	64	33	77	35	2	2	5	6	635

Note: The total includes measures assigned to more than one measure type.

Table A3 - Number of aggregated measures per measure type and UoM

	No action	Prevention				Protection					Preparedness				Recovery & review			Other	Grand Total
	M11	M21	M22	M23	M24	M31	M32	M33	M34	M35	M41	M42	M43	M44	M51	M52	M53	M61	
UK03				1															1
UK04				1					2										3
UK05										3									3
UK06		18	10	13	1	4	3	11	3		4	3		1	2	2	2	2	79
UK07		1			9			7	1	4	9	25	6	9	1		3	2	77
UK08			1		3			2	1		3		1						11
UK09		8	2	5	17	4	3	3	8	2	5	7	14	14		2	3		97
UK10		5			10				1		3	7	4	4	2	1	1		38
UK12									1										1
UKGBNIIENB	1	1		1				3	3			2	9						20
UKGBNIIENW		1		1				5	3			2	2						14
UKGBNINE		1		1				3	4			2	3						14
Grand Total	1	35	13	23	40	8	6	34	27	9	24	48	39	28	5	5	9	4	358
Average per UoM	<1	2	1	2	3	1	<1	2	2	1	2	3	3	2	<1	<1	1	<1	30

Note: The total includes measures assigned to more than one measure type.

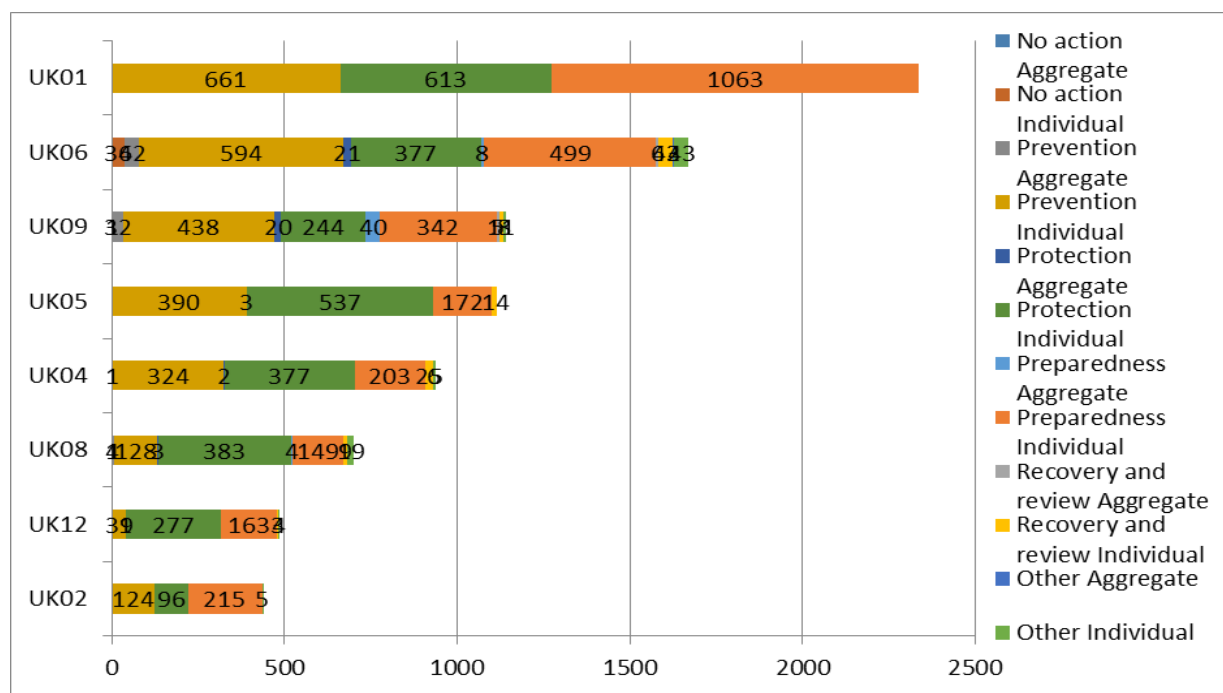
Table A4 - Total number of measures (aggregated and individual) per measure type and UoM, including duplicates

	No action		Total	Prevention		Total	Protection		Total	Preparedness		Total	Recovery & review		Total	Other		Total	Grand Total
	Aggr.	Indiv.		Aggr.	Indiv.		Aggr.	Indiv.		Aggr.	Indiv.		Aggr.	Indiv.		Aggr.	Indiv.		
UK01					661	661		613	613		1 063	1 063							2 337
UK02					124	124		96	96		215	215					5	5	440
UK03				1	31	32		73	73		57	57		3	3				165
UK04				1	324	325	2	377	379		203	203		25	25		6	6	938
UK05					390	390	3	537	540		172	172		14	14				1 116
UK06		36	36	42	594	636	21	377	398	8	499	507	6	43	49	2	43	45	1 671
UK07		5	5	10	20	30	12	137	149	49	40	89	4	18	22	2	6	8	303
UK08		1	1	4	128	132	3	383	386	4	149	153		9	9		19	19	700
UK09		1	1	32	438	470	20	244	264	40	342	382	5	11	16		8	8	1 141
UK10				15	105	120	1	86	87	18	172	190	4		4				401
UK11					13	13		26	26		51	51		1	1				91
UK12					39	39	1	277	278		163	163		3	3		4	4	487
UKGBNIIIE NB	1		1	2		2	6	22	28	11		11							42
UKGBNIIIE NW				2		2	8	13	21	4		4							27
UKGBNIN E				2		2	7	14	21	5	1	6							29
Grand Total	1	43	44	111	2 867	2 978	84	3 275	3 359	139	3127	3 266	19	127	146	4	91	95	9 888
Average per UoM	<1	3	3	7	191	199	6	218	224	9	208	218	1	8	10	<1	6	6	659

Note: The total includes measures assigned to more than one measure type.

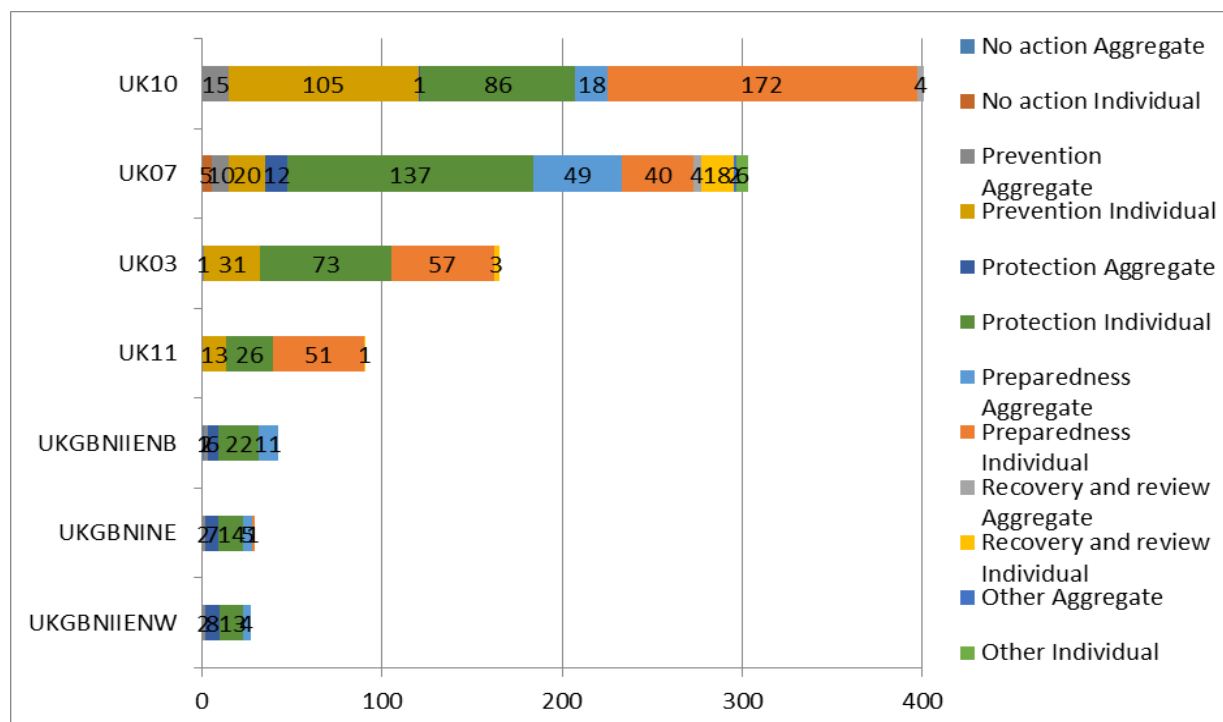
The information in Table A4 is visualised in the following figures:

Figure A1 - Number of total measures (individual and aggregate) by measure aspect, part 1
(UoMs with over 401 measures)



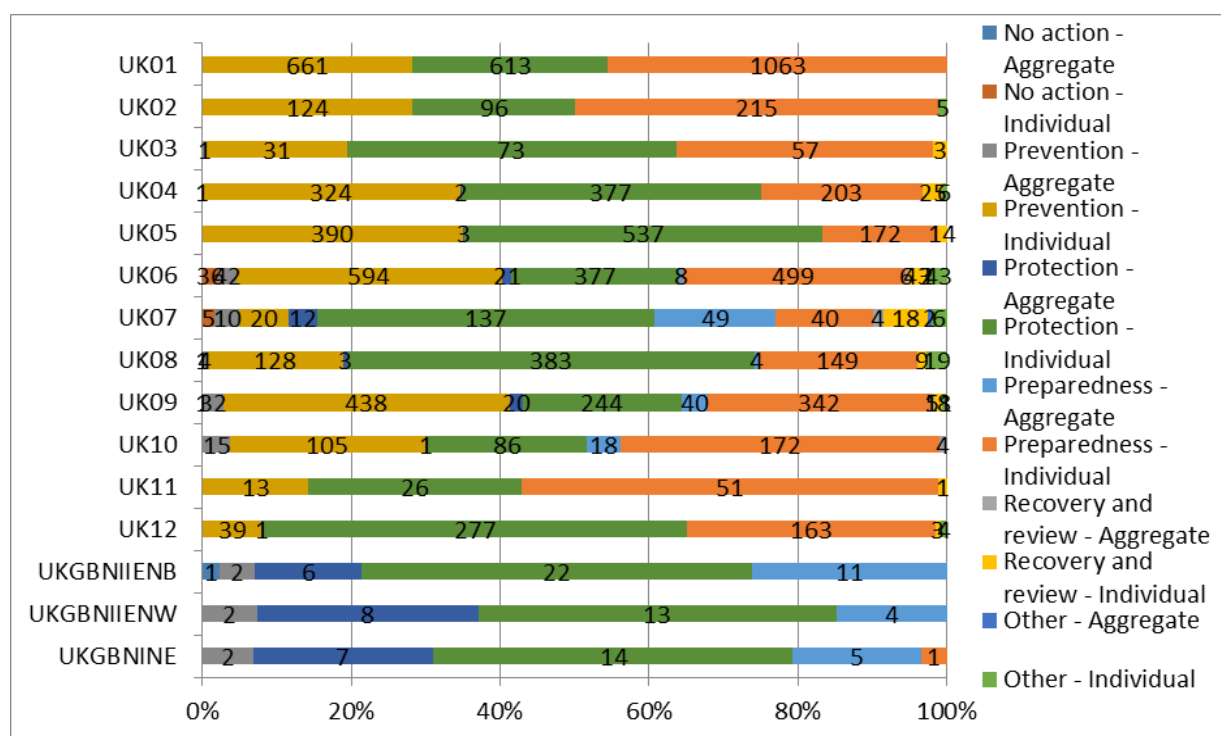
Note: The total includes measures assigned to more than one measure type.

Figure A2 - Number of total measures (individual and aggregate) by measure aspect, part 2
(UoMs with up to 401 measures)



Note: The total includes measures assigned to more than one measure type.

Figure A3 - Share of total measures (aggregated and individual) by measure aspect



Note: The total includes measures assigned to more than one measure type.

Measure details: cost

Member States were requested to report information on:

- Cost (optional field);
- Cost explanation (optional field).

Cost explanation: 1 102 different answers were given. No cost explanation: 3 778 measures, and 1 924 measures were given as “N/A”, “unknown”, or “TBC” (or variations thereof).

Cost was given for 6 110 measures. Three measures were reported as having been included in other programmes, one measure was reported as “NIL”. The highest was between £350 m and £750 m. The remaining figures were categorised below:

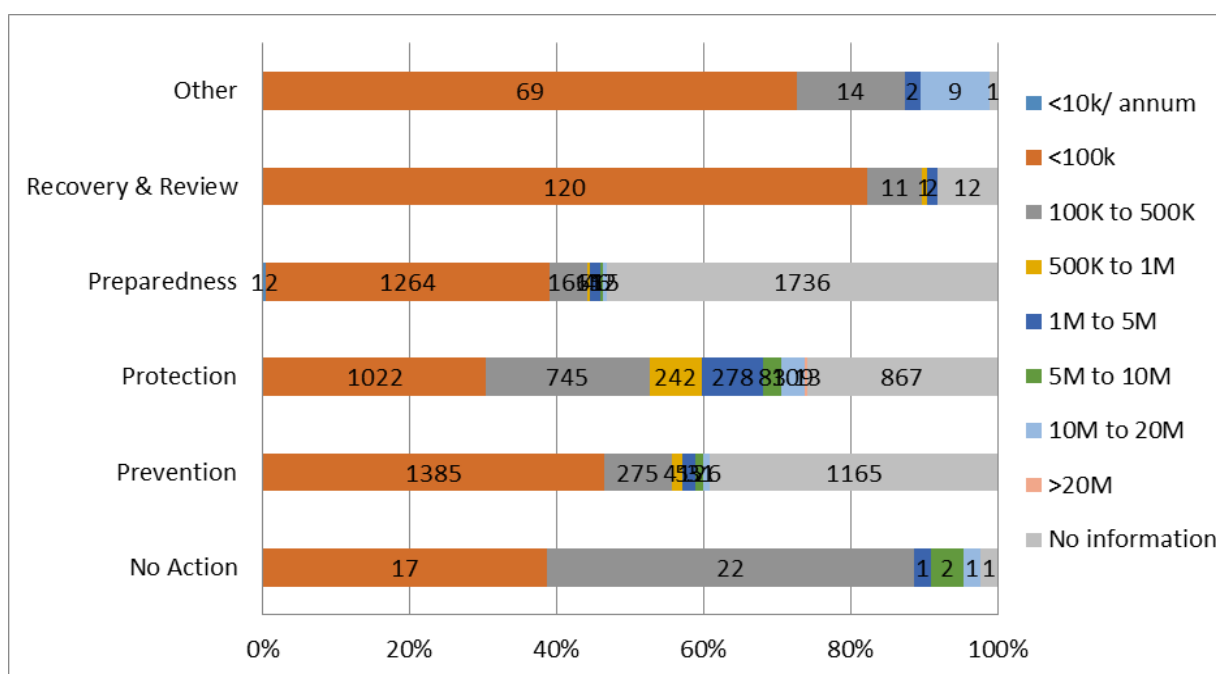
Table A5 – Cost (in GBP) per measure aspect

	<10k/ annum	<100k	100K to 500K	500K to 1M	1M to 5M	5M to 10M	10M to 20M	>20M	No information	Grand Total
No Action		17	22		1	2	1		1	44
Prevention		1 385	275	41	55	31	26		1 165	2 978
Protection		1 022	745	242	278	83	109	13	867	3 359

	<10k/ annum	<100k	100K to 500K	500K to 1M	1M to 5M	5M to 10M	10M to 20M	>20M	No information	Grand Total
Preparedness	12	1 264	166	15	46	12	15		1736	3 266
Recovery & Review		120	11	1	2				12	146
Other		69	14		2		9		1	95
Grand Total	12	3 877	1 233	299	384	128	160	13	3782	9 888

Note: The total includes measures assigned to more than one measure type. Please note that 12 measures reported costs per annum, while the other measures reported total costs.

Figure A4 – Visualisation of Table A5: Cost (in GBP) per measure aspect



Note: The total includes measures assigned to more than one measure type. Please note that 12 measures reported costs per annum, while the other measures reported total costs.

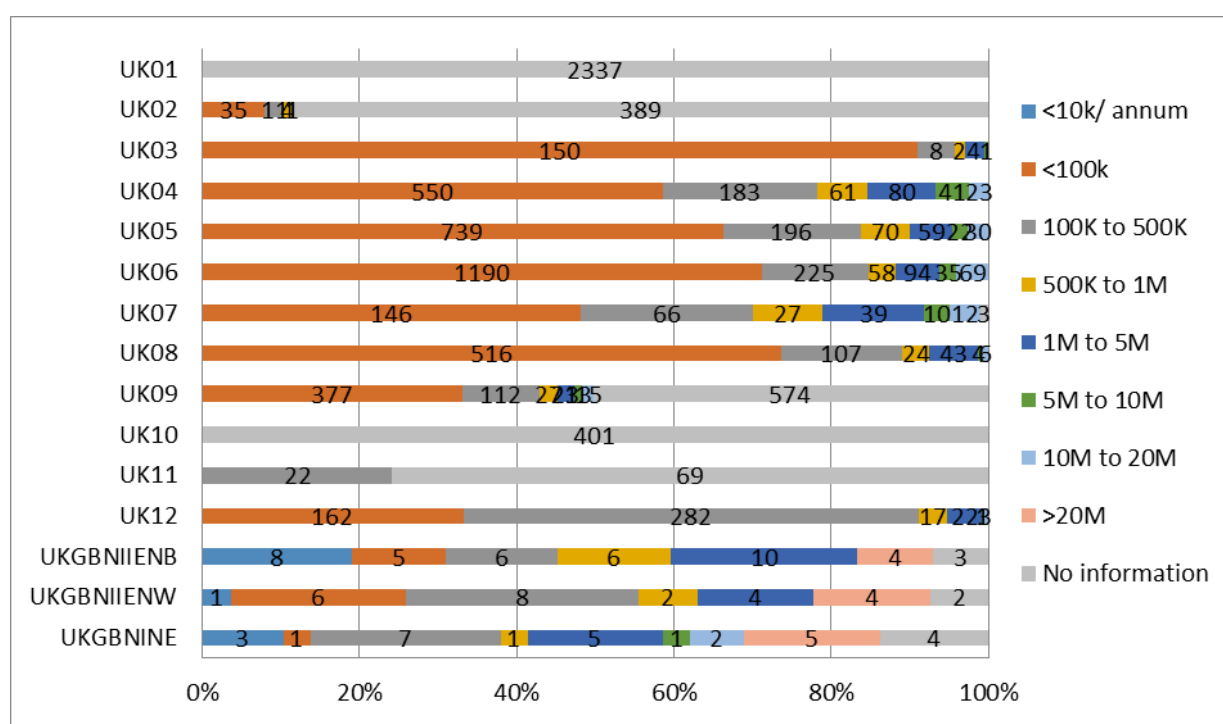
Table A6 – Cost (in GBP) per UoM

	<10k/ annum	<100k	100K to 500K	500K to 1M	1M to 5M	5M to 10M	10M to 20M	>20M	No informa tion	Grand Total
UK01									2 337	2 337
UK02		35	11	4	1				389	440
UK03		150	8	2	4	1				165
UK04		550	183	61	80	41	23			938
UK05		739	196	70	59	22	30			1 116

	<10k/ annum	<100k	100K to 500K	500K to 1M	1M to 5M	5M to 10M	10M to 20M	>20M	No informa tion	Grand Total
UK06		1 190	225	58	94	35	69			1 671
UK07		146	66	27	39	10	12		3	303
UK08		516	107	24	43	4	6			700
UK09		377	112	27	23	13	15		574	1 141
UK10									401	401
UK11			22						69	91
UK12		162	282	17	22	1	3			487
UKGBNIIENB	8	5	6	6	10			4	3	42
UKGBNIIENW	1	6	8	2	4			4	2	27
UKGBNINE	3	1	7	1	5	1	2	5	4	29
Grand Total	12	3 877	1 233	299	384	128	160	13	3 782	9 888
Average per UoM	1	258	82	20	26	9	11	1	252	659

Note: The total includes measures assigned to more than one measure type. Please note that 12 measures reported costs per annum, while the other measures reported total costs.

Figure A5 – Visualisation of Table A6: Cost (in GBP) per UoM



Note: The total includes measures assigned to more than one measure type. Please note that 12 measures reported costs per annum, while the other measures reported total costs.

Measure details: name & location

Member States were requested to report information on the following:

- Location of implementation of measures (mandatory field);

- Geographic coverage of the impact of measures (optional field).

Location of measures

The UK has provided the location of measures in the reporting sheets for all 9 888 measures, however, this was an open question, and as such, the level of detail varied with 2 588 different responses were given. It is thus not practical to aggregate the information.

Geographic coverage

The UK has given information for all measures concerning the Geographic Coverage of the measures in the reporting sheets. For those measures for which no information was provided, information on the Location of Measures was used to determine Geographic Coverage.

The following categories were used to signify the areas in which the Measures are implemented:

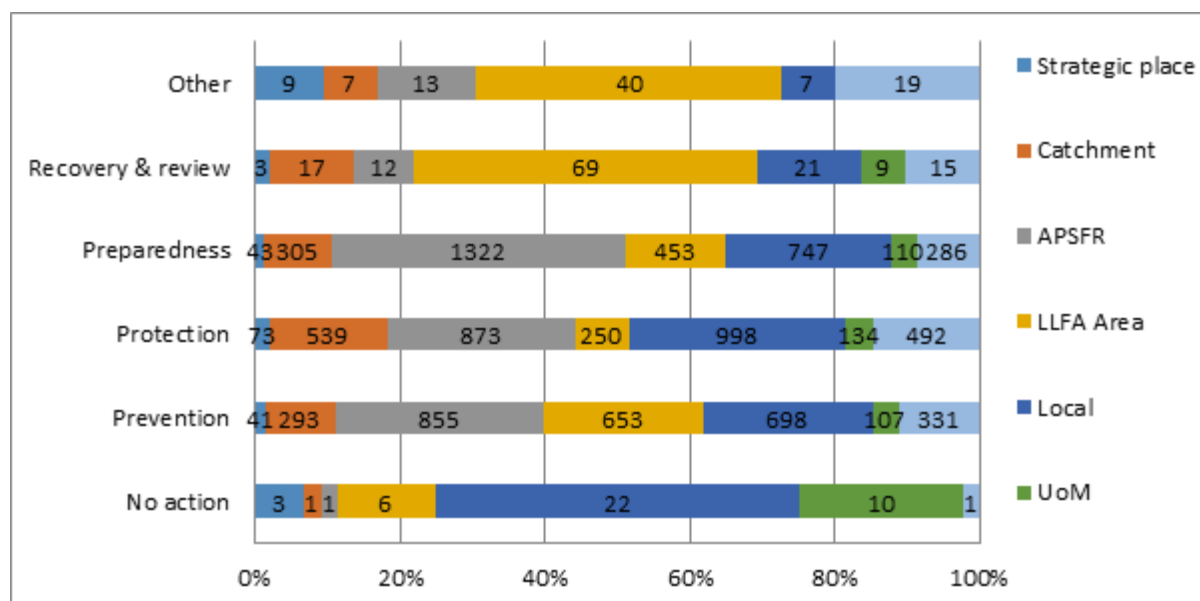
- APSFR: Areas of Potential Significant Risk;
- Catchment;
- UoM;
- LLFA Area;
- Local, including towns/cities/boroughs/communities and other local areas;
- Strategic place;
- Other.

Table A7 – Geographic coverage of the measures by measure aspect

	Strategic place	Catchment	APSFR	LLFA Area	Local	UoM	Other	Grand Total
No action	3	1	1	6	22	10	1	44
Prevention	41	293	855	653	698	107	331	2 978
Protection	73	539	873	250	998	134	492	3 359
Preparedness	43	305	1 322	453	747	110	286	3 266
Recovery & review	3	17	12	69	21	9	15	146
Other	9	7	13	40	7		19	95
Grand Total	172	1 162	3 076	1 471	2 493	370	1 144	9 888

Note: The total includes measures assigned to more than one measure type. LLFA: Lead Local Flood Authority

Figure A6 - Visualisation of Table A7: Geographic coverage of the measures by measure aspect



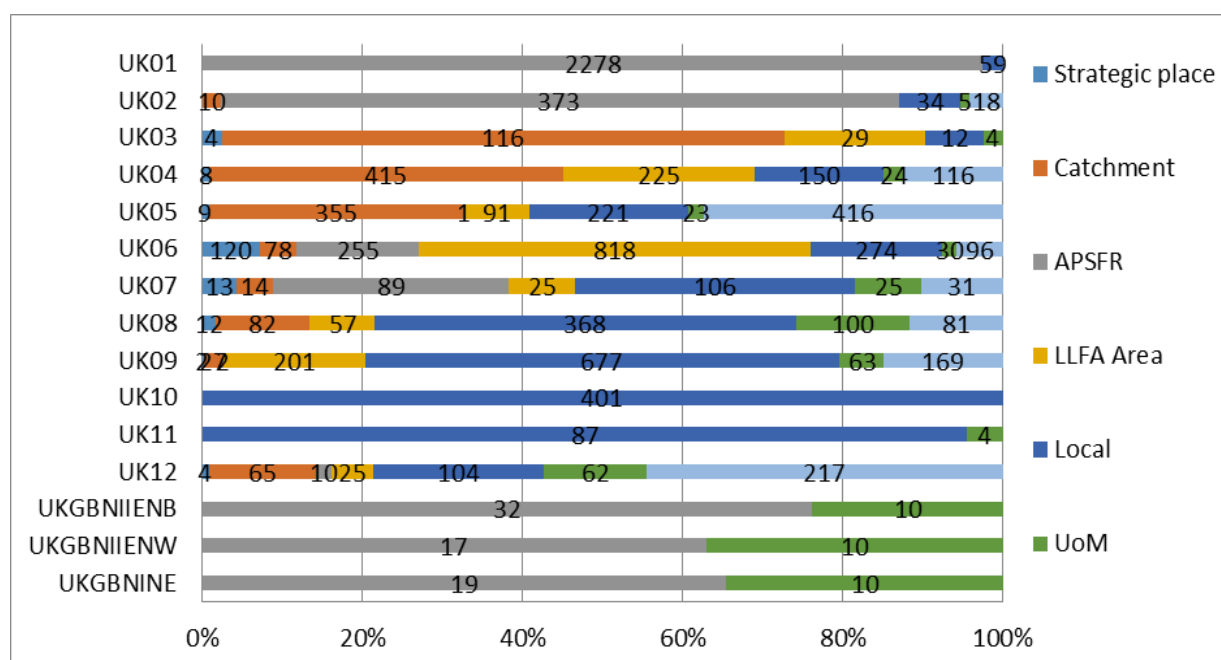
Note: The total includes measures assigned to more than one measure type. LLFA: Lead Local Flood Authority

Table A8 - Geographic coverage of the measures by UoM

	Strategic place	Catchment	APSFR	LLFA Area	Local	UoM	Other	Grand Total
UK01			2 278		59			2 337
UK02		10	373		34	5	18	440
UK03	4	116		29	12	4		165
UK04	8	415		225	150	24	116	938
UK05	9	355	1	91	221	23	416	1 116
UK06	120	78	255	818	274	30	96	1 671
UK07	13	14	89	25	106	25	31	303
UK08	12	82		57	368	100	81	700
UK09	2	27	2	201	677	63	169	1 141
UK10					401			401
UK11					87	4		91
UK12	4	65	10	25	104	62	217	487
UKGBNIIENB			32			10		42
UKGBNIIENW			17			10		27
UKGBNINE			19			10		29
Grand Total	172	1 162	3 076	1 471	2 493	370	1 144	9 888
Average per UoM	11	77	205	98	166	25	76	659

Note: The total includes measures assigned to more than one measure type. LLFA: Lead Local Flood Authority

Figure A7 - Visualisation of Table A8: Geographic coverage of the measures by UoM



Note: The total includes measures assigned to more than one measure type. LLFA: Lead Local Flood Authority

Measure details: objectives

Member States were requested to report information on:

- Objectives linked to measures (optional field, complementary to the summary provided in the textual part of the XML);
- Category of priority (Conditional, reporting on either ‘category of priority’ or ‘timetable’ is required);
- Timetable (Conditional, reporting on either ‘category of priority’ or ‘timetable’ is required).

Objectives

The Guidance Document indicates that for each measure, an “Explanation of how the measure contributes to the objectives” can be provided (this is an optional field). The UK reported 2 299 different objectives for the UoMs in the reporting sheets, for 6 079 different measures. Consequently, it was not possible to aggregate the information.

The following UoMs did not provide information:

- for every measure: UK02; UK05; UK06; UK09; UK11 and UK12;
- any information on objectives: UK01; UK10 and UKGBNIIENW.

Category of priority

The UK provided information for the priority of most of its measures in the reporting sheets. The following categories are used:

- Critical;
- Very high;
- High;
- Moderate;
- Low.

The following UoMs did not provide information:

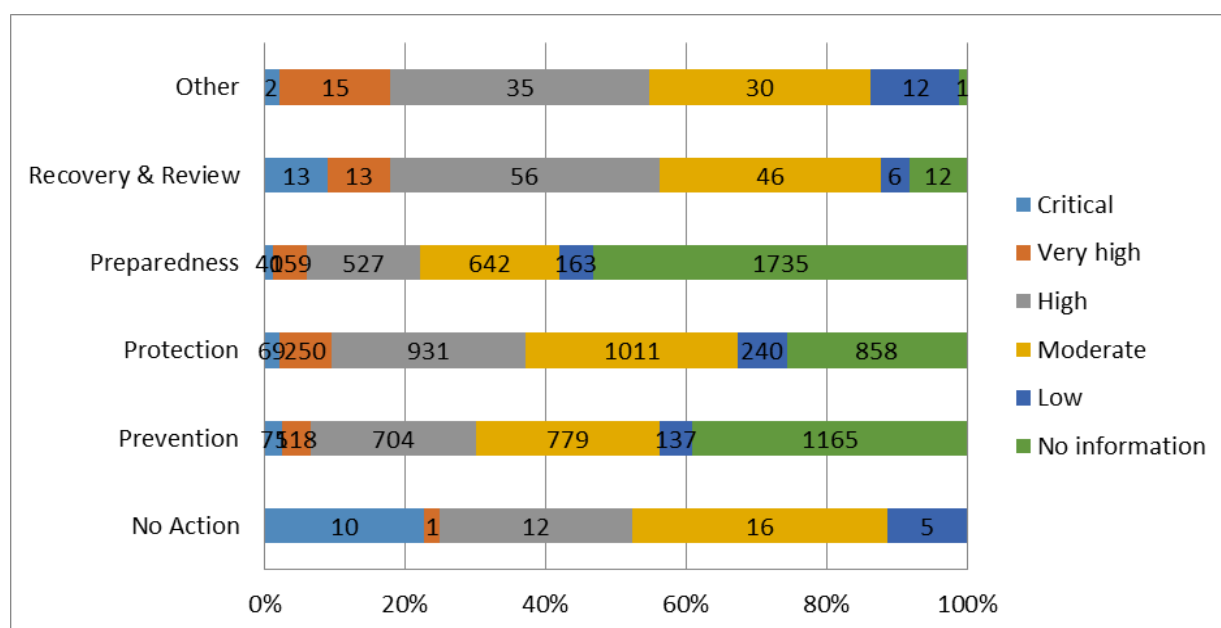
- for some measures: UK02; UK09; UK11 and UKGBNIIENB;
- for any measures: UK01 and UK10.

Table A9 - Category of priority by measure aspect

	Critical	Very high	High	Moderate	Low	No information	Grand Total
No Action	10	1	12	16	5		44
Prevention	75	118	704	779	137	1 165	2 978
Protection	69	250	931	1 011	240	858	3 359
Preparedness	40	159	527	642	163	1 735	3 266
Recovery & Review	13	13	56	46	6	12	146
Other	2	15	35	30	12	1	95
Grand Total	209	556	2 265	2 524	563	3 771	9 888

Note: The total includes measures assigned to more than one measure type.

Figure A8 - Visualisation of Table A9: Category of priority by measure aspect



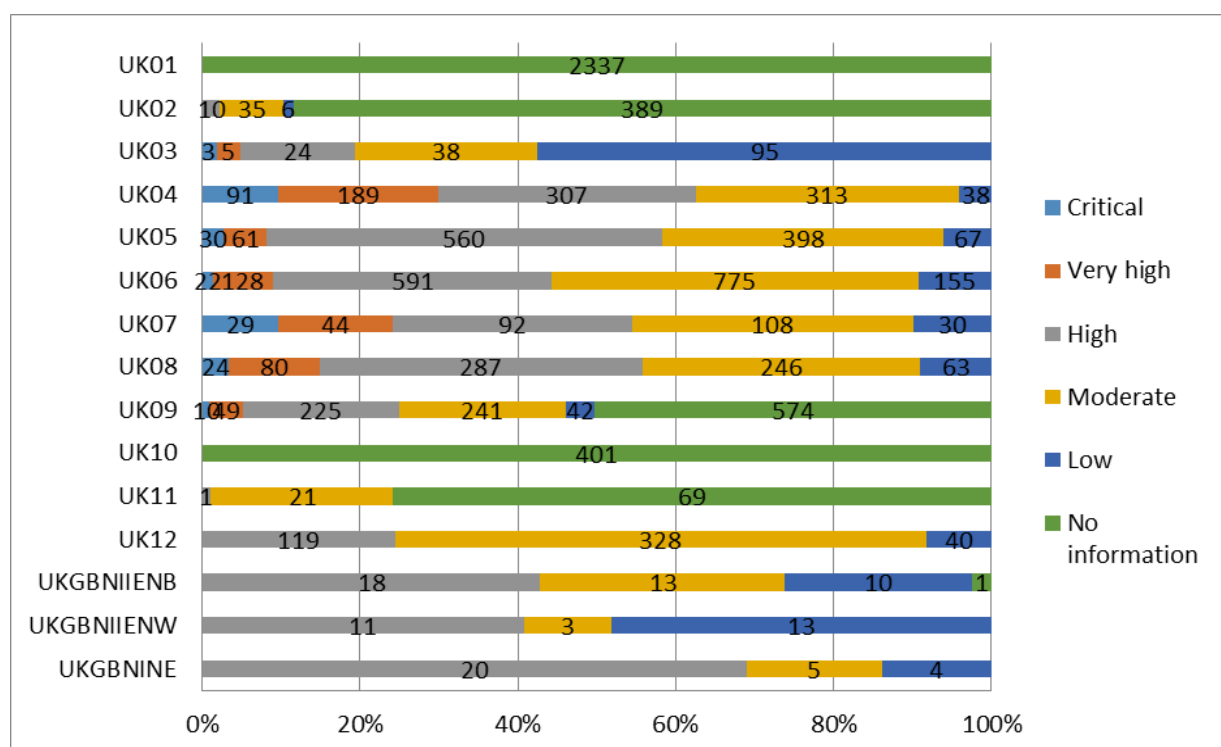
Note: The total includes measures assigned to more than one measure type.

Table A10 - Category of priority by UoM

	Critical	Very high	High	Moderate	Low	No information	Grand Total
UK01						2 337	2 337
UK02			10	35	6	389	440
UK03	3	5	24	38	95		165
UK04	91	189	307	313	38		938
UK05	30	61	560	398	67		1 116
UK06	22	128	591	775	155		1 671
UK07	29	44	92	108	30		303
UK08	24	80	287	246	63		700
UK09	10	49	225	241	42	574	1 141
UK10						401	401
UK11			1	21		69	91
UK12			119	328	40		487
UKGBNIIENB			18	13	10	1	42
UKGBNIIENW			11	3	13		27
UKGBNINE			20	5	4		29
Grand Total	209	556	2 265	2 524	563	3 771	9 888
Average per UoM	14	37	151	168	38	251	659

Note: The total includes measures assigned to more than one measure type.

Figure A9 - Visualisation of Table A10: Category of priority by UoM



Note: The total includes measures assigned to more than one measure type.

Timetable

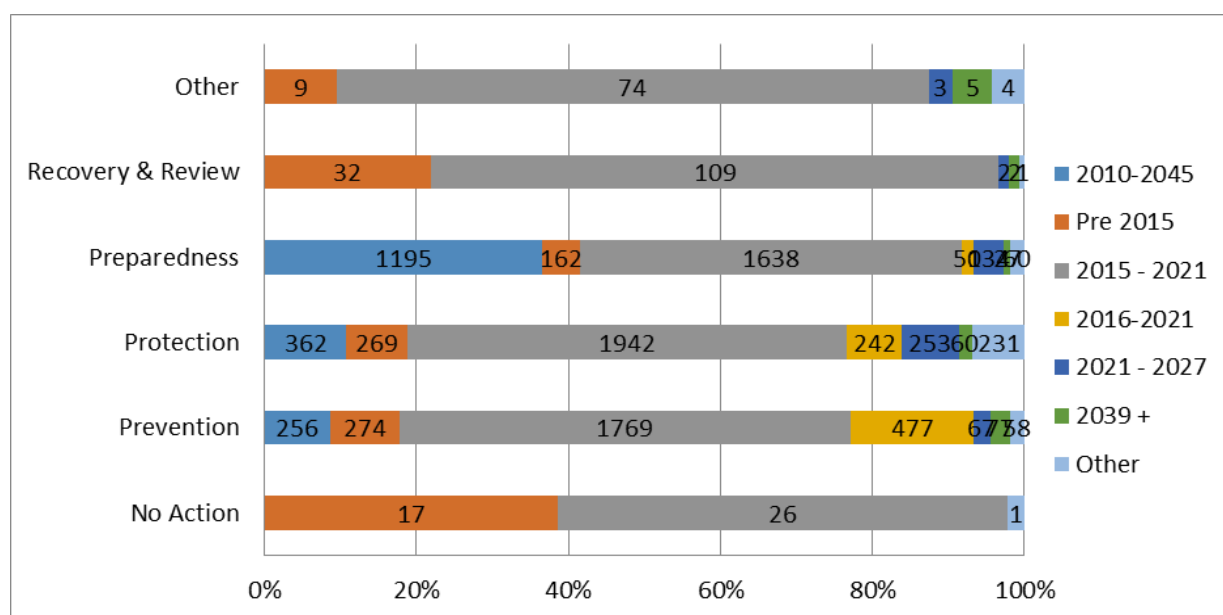
Information on the timetable is given for nearly all measures in the reporting sheets. The responses have been categorised as follows:

Table A11 – Timetable per measure aspect

	2010-2045	Pre 2015	2015 - 2021	2016-2021	2021 - 2027	2039 +	Other	Grand Total
No Action		17	26				1	44
Prevention	256	274	1 769	477	67	77	58	2 978
Protection	362	269	1 942	242	253	60	231	3 359
Preparedness	1 195	162	1 638	50	134	27	60	3 266
Recovery & Review		32	109		2	2	1	146
Other		9	74		3	5	4	95
Grand Total	1 813	763	5 558	769	459	171	355	9 888

Note: The total includes measures assigned to more than one measure type.

Figure A10 – Visualisation of Table A11: Timetable per measure aspect



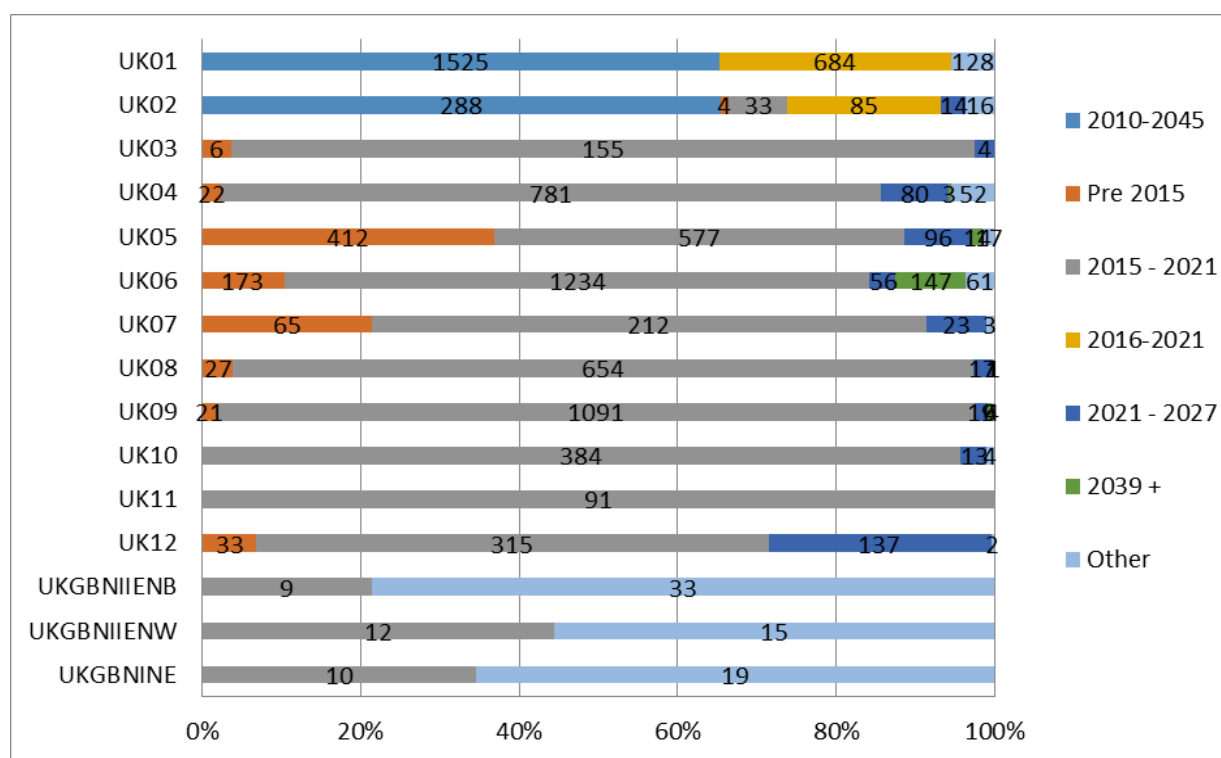
Note: The total includes measures assigned to more than one measure type.

Table A12 – Timetable per UoM

	2010-2045	Pre 2015	2015 - 2021	2016-2021	2021 - 2027	2039 +	Other	Grand Total
UK01	1 525			684			128	2 337
UK02	288	4	33	85	14		16	440
UK03		6	155		4			165
UK04		22	781		80	3	52	938
UK05		412	577		96	14	17	1 116
UK06		173	1 234		56	147	61	1 671
UK07		65	212		23		3	303
UK08		27	654		17	1	1	700
UK09		21	1 091		19	6	4	1 141
UK10			384		13		4	401
UK11			91					91
UK12		33	315		137		2	487
UKGBNIIENB			9				33	42
UKGBNIIENW			12				15	27
UKGBNINE			10				19	29
Grand Total	1 813	763	5 558	769	459	171	355	9 888
Average per UoM	121	51	371	51	31	11	24	1236

Note: The total includes measures assigned to more than one measure type.

Figure A11 - Visualisation of Table A12: Timetable per UoM



Note: The total includes measures assigned to more than one measure type.

Measure details: authorities

Member States were requested to report information on:

- Name of the responsible authority (optional if ‘level of responsibility’ is reported);
- Level of responsibility (optional if ‘name of the responsible authority’ is reported).

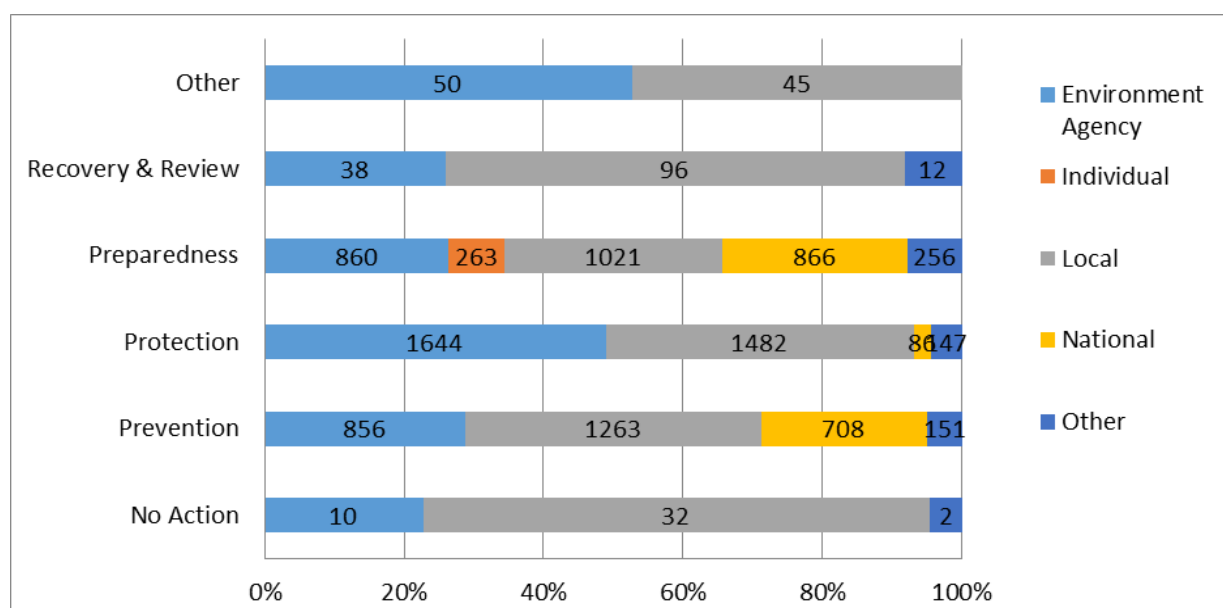
The UK reported the level of responsibility for all measures.

Table A13 - Level of responsibility by measure aspect

	Environment Agency	Individual	Local	National	Other	Grand Total
No Action	10		32		2	44
Prevention	856		1 263	708	151	2 978
Protection	1 644		1 482	86	147	3 359
Preparedness	860	263	1 021	866	256	3 266
Recovery & Review	38		96		12	146
Other	50		45			95
Grand Total	3 458	263	3 939	1 660	568	9 888

Note: The total includes measures assigned to more than one measure type.

Figure A12 - Visualisation of Table A13: Level of responsibility by measure aspect



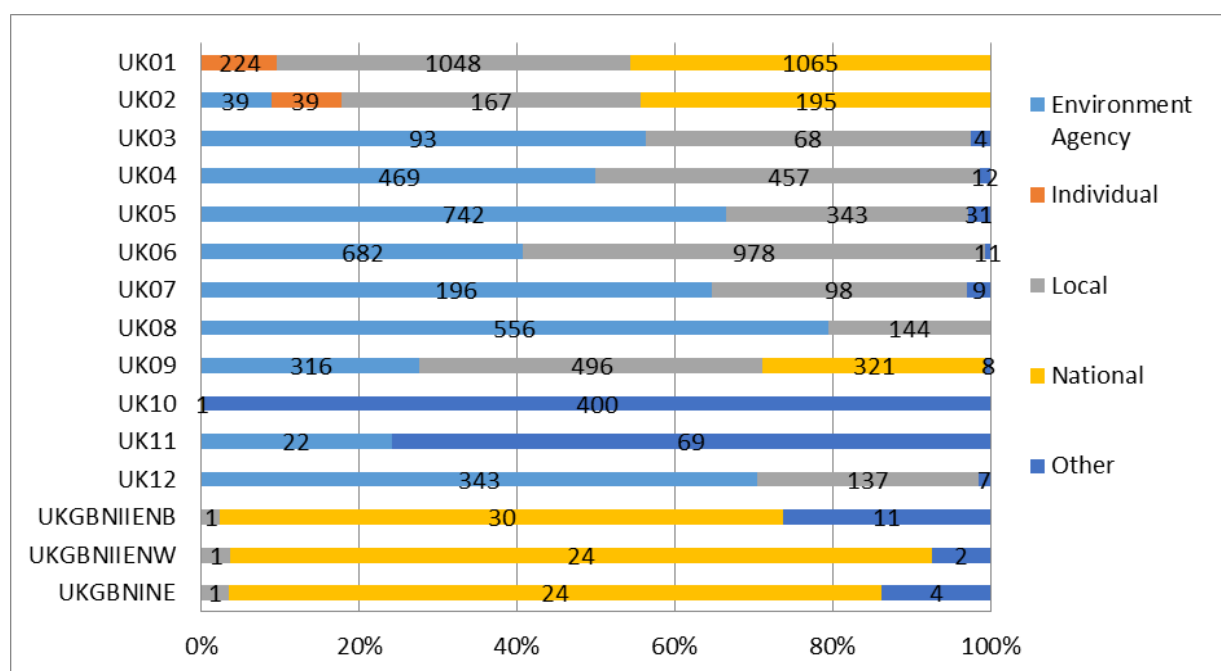
Note: The total includes measures assigned to more than one measure type.

Table A14 - Level of responsibility by UoM

	Environment Agency	Individual	Local	National	Other	Grand Total
UK01		224	1 048	1 065		2 337
UK02	39	39	167	195		440
UK03	93		68		4	165
UK04	469		457		12	938
UK05	742		343		31	1 116
UK06	682		978		11	1 671
UK07	196		98		9	303
UK08	556		144			700
UK09	316		496	321	8	1 141
UK10				1	400	401
UK11	22				69	91
UK12	343		137		7	487
UKGBNIIENB			1	30	11	42
UKGBNIIENW			1	24	2	27
UKGBNINE			1	24	4	29
Grand Total	3 458	263	3 939	1 660	568	9 888
Average per UoM	231	18	263	111	38	659

Note: The total includes measures assigned to more than one measure type.

Figure A13 - Visualisation of Table A14: Level of responsibility by UoM



Note: The total includes measures assigned to more than one measure type.

Measure details: progress

Member States were requested to report information on:

- Progress of implementation of measures (mandatory field) – this is a closed question whose responses are analysed below;
- Progress description of the implementation of measures (optional field) – this is an open text question for which not all Member States reported and whose answers are not analysed here.

UK reported information about the progress of implementation of the measures. The Progress of implementation was reported as¹⁴⁰:

- COM (completed);
- OGC (ongoing construction);
- POG (progress ongoing);
- NS (not started).

A full definition of these terms can be found at the end of this section.

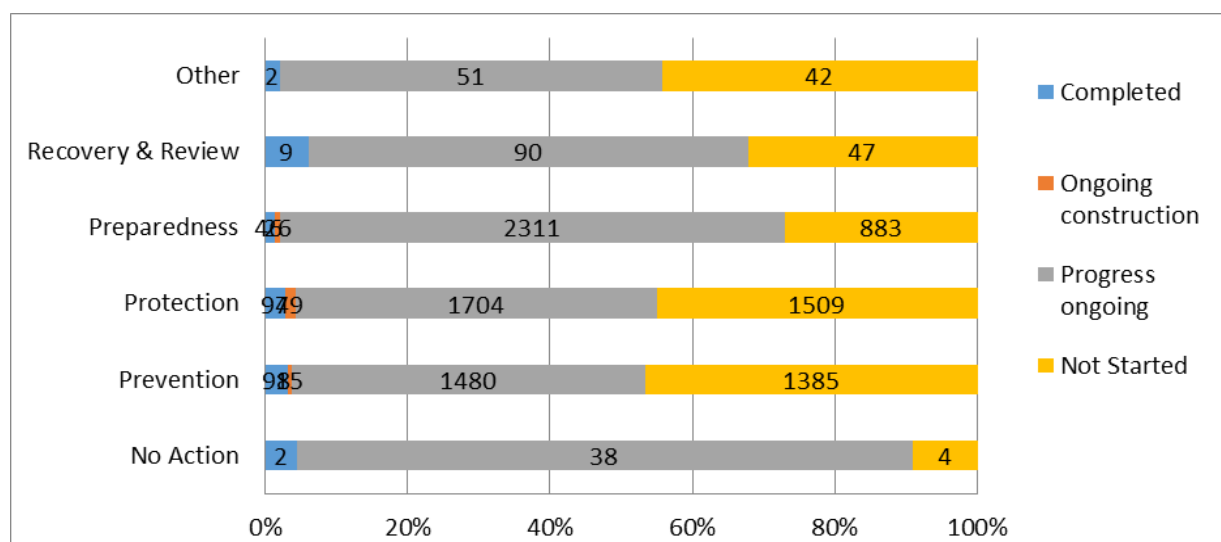
¹⁴⁰ Guidance for Reporting under the FD (2007/60/EC):
<https://circabc.europa.eu/w/browse/a3c92123-1013-47ff-b832-16e1caaafc9a>

Table A15 – Progress of implementation by measure aspect

	Completed	Ongoing construction	Progress ongoing	Not Started	Grand Total
No Action	2		38	4	44
Prevention	98	15	1 480	1 385	2 978
Protection	97	49	1 704	1 509	3 359
Preparedness	46	26	2 311	883	3 266
Recovery & Review	9		90	47	146
Other	2		51	42	95
Grand Total	254	90	5 674	3 870	9 888

Note: The total includes measures assigned to more than one measure type.

Figure A14 - Visualisation of Table A15: Progress of implementation by measure aspect



Note: The total includes measures assigned to more than one measure type.

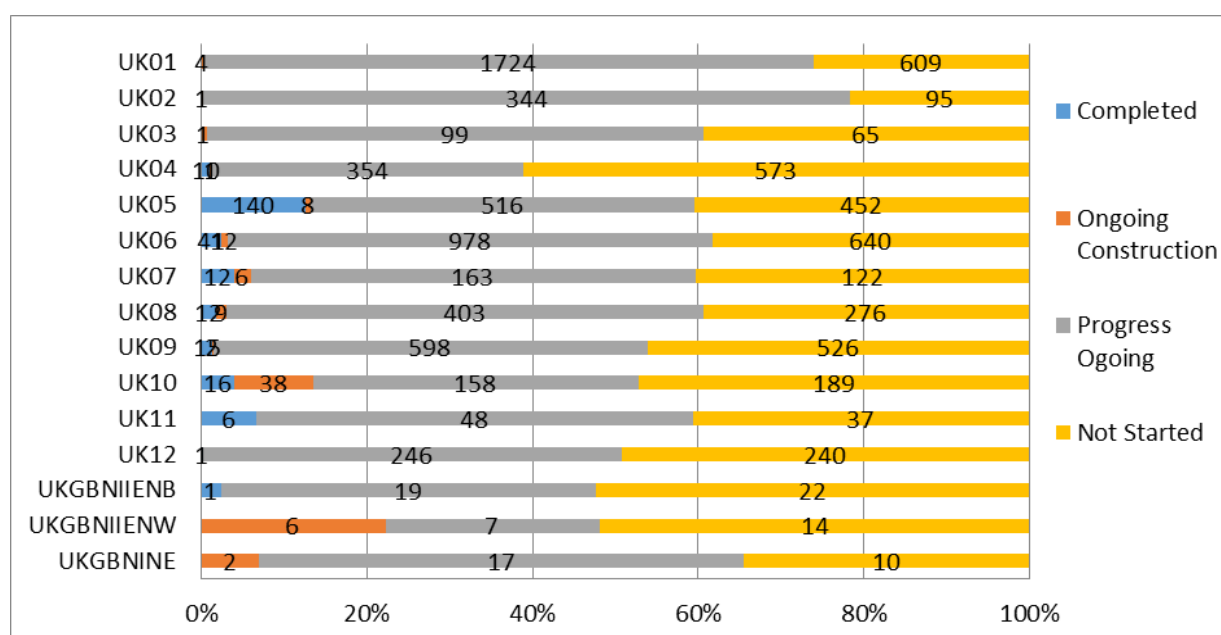
Table A16 – Progress of implementation by UoM

	Completed	Ongoing Construction	Progress Ongoing	Not Started	Grand Total
UK01		4	1 724	609	2 337
UK02		1	344	95	440
UK03		1	99	65	165
UK04	10	1	354	573	938
UK05	140	8	516	452	1 116
UK06	41	12	978	640	1 671
UK07	12	6	163	122	303
UK08	12	9	403	276	700
UK09	15	2	598	526	1 141
UK10	16	38	158	189	401
UK11	6		48	37	91
UK12	1		246	240	487

	Completed	Ongoing Construction	Progress Ongoing	Not Started	Grand Total
UKGBNIIENB	1		19	22	42
UKGBNIIENW		6	7	14	27
UKGBNINE		2	17	10	29
Grand Total	254	90	5 674	3 870	9 888
Average per UoM	17	6	378	258	659

Note: The total includes measures assigned to more than one measure type.

Figure A15 - Visualisation of Table A16: Progress of implementation by UoM



Note: The total includes measures assigned to more than one measure type.

The categories describing the progress of measures are defined in the EU Reporting Guidance Document on the FD.

For **measures involving construction or building works** (e.g. a waste water treatment plant, a fish pass, a river restoration project, etc.):

- Not started (NS) means the technical and/or administrative procedures necessary for starting the construction or building works have not started.
- Progress on-going (POG) means that administrative procedures necessary for starting the construction or building works have started but are not finalised. The simple inclusion in the RBMPs is not considered planning in this context.
- On-going construction (OGC) means the construction or building works have started but are not finalized.
- Completed (COM) means the works have been finalised and the facilities are operational (maybe only in testing period in case e.g. a waste water treatment plant).

For **measures involving advisory services** (e.g. training for farmers):

- Not started (NS) means the advisory services are not yet operational and have not

provided any advisory session yet.

- Progress on-going (POG) means the advisory services are operational and are being used. This is expected to be the situation for all multi- annual long/mid-term advisory services that are expected to be operational during the whole or most of RBMP cycle.
- On-going construction (OGC): Not applicable
- Completed (COM) means an advisory service that has been implemented and has been finalised, i.e. is no longer operational. This is expected only for advisory services that are relatively short term or one-off, and which duration is time limited in relation to the whole RBMP cycle.

For measures involving research, investigation or studies:

- Not started (NS) means the research, investigation or study has not started, i.e. contract has not been signed or there has not been any progress.
- Progress on-going (POG) means the research, investigation or study has been contracted or started and is being developed at the moment.
- On-going construction (OGC): Not applicable
- Completed (COM) means the research, investigation or study has been finalised and has been delivered, i.e. the results or deliverables are available (report, model, etc.).

For measures involving administrative acts (e.g. licenses, permits, regulations, instructions, etc.):

- Not started (NS) means the administrative file has not been opened and there has not been any administrative action as regards the measure.
- Progress on-going (POG) means an administrative file has been opened and at least a first administrative action has been taken (e.g. requirement to an operator to provide information to renew the licensing, request of a permit by an operator, internal consultation of draft regulations, etc.). If the measure involves more than one file, the opening of one would mean already “ongoing”.
- On-going construction (OGC): Not applicable
- Completed (COM) means the administrative act has been concluded (e.g. the license or permit has been issued; the regulation has been adopted, etc.). If the measure involves more than one administrative act, “completed” is achieved only when all of them have been concluded.

Measure details: other

Member States were requested to provide information on:

- Other Community Acts associated to the measures reported (optional field);
- Any other information reported (optional field).

In the reporting sheets, the UK did not provide information on Other Community Acts. The UK did report information for ‘any other information’ for 6 022 measures. Within that number, there are 4 903 different answers.

Annex B: Definitions of measure types

Table B1 *Types of flood risk management measures¹⁴¹*

	No Action
M11	No Action, No measure is proposed to reduce the flood risk in the APSFR or other defined area,
	Prevention
M21	Prevention, Avoidance, Measure to prevent the location of new or additional receptors in flood prone areas, such as land use planning policies or regulation
M22	Prevention, Removal or relocation, Measure to remove receptors from flood prone areas, or to relocate receptors to areas of lower probability of flooding and/or of lower hazard
M23	Prevention, Reduction, Measure to adapt receptors to reduce the adverse consequences in the event of a flood actions on buildings, public networks, etc...
M24	Prevention, Other prevention, Other measure to enhance flood risk prevention (may include, flood risk modelling and assessment, flood vulnerability assessment, maintenance programmes or policies etc...)
	Protection
M31	Protection Natural flood management / runoff and catchment management, Measures to reduce the flow into natural or artificial drainage systems, such as overland flow interceptors and / or storage, enhancement of infiltration, etc and including in-channel , floodplain works and the reforestation of banks, that restore natural systems to help slow flow and store water.
M32	Protection, Water flow regulation, Measures involving physical interventions to regulate flows, such as the construction, modification or removal of water retaining structures (e.g., dams or other on-line storage areas or development of existing flow regulation rules), and which have a significant impact on the hydrological regime.
M33	Protection, Channel, Coastal and Floodplain Works, Measures involving physical interventions in freshwater channels, mountain streams, estuaries, coastal waters and flood-prone areas of land, such as the construction, modification or removal of structures or the alteration of channels, sediment dynamics management, dykes, etc.
M34	Protection, Surface Water Management, Measures involving physical interventions to reduce surface water flooding, typically, but not exclusively, in an urban environment, such as enhancing artificial drainage capacities or though sustainable drainage systems (SuDS).
M35	Protection, Other Protection, Other measure to enhance protection against flooding, which may include flood defence asset maintenance programmes or policies
	Preparedness
M41	Preparedness, Flood Forecasting and Warning, Measure to establish or enhance a flood forecasting or warning system
M42	Preparedness, Emergency Event Response Planning / Contingency planning, Measure to establish or enhance flood event institutional emergency response planning
M43	Preparedness, Public Awareness and Preparedness, Measure to establish or enhance the public awareness or preparedness for flood events
M44	Preparedness, Other preparedness, Other measure to establish or enhance preparedness for flood events to reduce adverse consequences

¹⁴¹ Guidance for Reporting under the FD (2007/60/EC):
<https://circabc.europa.eu/w/browse/a3c92123-1013-47ff-b832-16e1caaaf9a>

	Recovery & Review
M51	Recovery and Review (Planning for the recovery and review phase is in principle part of preparedness), Individual and societal recovery, Clean-up and restoration activities (buildings, infrastructure, etc), Health and mental health supporting actions, incl. managing stress Disaster financial assistance (grants, tax), incl. disaster legal assistance, disaster unemployment assistance, Temporary or permanent relocation , Other
M52	Recovery and Review, Environmental recovery, Clean-up and restoration activities (with several sub-topics as mould protection, well-water safety and securing hazardous materials containers)
M53	Recovery and Review, Other, Other recovery and review Lessons learnt from flood events Insurance policies
	Other
M61	Other

Catalogue of Natural Water Retention Measures (NWRM)

NWRM cover a wide range of actions and land use types. Many different measures can act as NWRM, by encouraging the retention of water within a catchment and, through that, enhancing the natural functioning of the catchment. The catalogue developed in the NWRM project represents a comprehensive but non-prescriptive wide range of measures; other measures, or similar measures called by a different name, could also be classified as NWRM.

To ease access to measures, the catalogue of measures hereunder is sorted by the primary land use in which it was implemented: Agriculture; Forest; Hydromorphology; Urban. Most of the measures however can be applied to more than one land use type.

Table B2 *List of NWRMs*

Agriculture	Forest	Hydro Morphology	Urban
A01 Meadows and pastures	F01 Forest riparian buffers	N01 Basins and ponds	U01 Green Roofs
A02 Buffer strips and hedges	F02 Maintenance of forest cover in headwater areas	N02 Wetland restoration and management	U02 Rainwater Harvesting
A03 Crop rotation	F03 Afforestation of reservoir catchments	N03 Floodplain restoration and management	U03 Permeable surfaces
A04 Strip cropping along contours	F04 Targeted planting for 'catching' precipitation	N04 Re-meandering	U04 Swales
A05 Intercropping	F05 Land use conversion	N05 Stream bed re-naturalization	U05 Channels and rills
A06 No till agriculture	F06 Continuous cover forestry	N06 Restoration and reconnection of seasonal streams	U06 Filter Strips

Agriculture	Forest	Hydro Morphology	Urban
A07 Low till agriculture	F07 'Water sensitive' driving	N07 Reconnection of oxbow lakes and similar features	U07 Soakaways
A08 Green cover	F08 Appropriate design of roads and stream crossings	N08 Riverbed material renaturalisation	U08 Infiltration Trenches
A09 Early sowing	F09 Sediment capture ponds	N09 Removal of dams and other longitudinal barriers	U09 Rain Gardens
A10 Traditional terracing	F10 Coarse woody debris	N10 Natural bank stabilisation	U10 Detention Basins
A11 Controlled traffic farming	F11 Urban forest parks	N11 Elimination of riverbank protection	U11 Retention Ponds
A12 Reduced stocking density	F12 Trees in Urban areas	N12 Lake restoration	U12 Infiltration basins
A13 Mulching	F13 Peak flow control structures	N13 Restoration of natural infiltration to groundwater	
	F14 Overland flow areas in peatland forests	N14 Re-naturalisation of polder areas	

Source: www.nwrm.eu