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**COMMISSION STAFF WORKING DOCUMENT**

**First Flood Risk Management Plans - Member State: Spain**

*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
EEA	European Environment Agency
FD	Floods Directive
FHRM	Flood Hazard and Risk Map
FRMP	Flood Risk Management Plan
NGO	Non-Governmental Organisation
NWRM	Natural Water Retention Measures
PFRA	Preliminary Flood Risk Assessments
PoM	Programme of Measures
RBD	River Basin District
RBMP	River Basin Management Plan
SEA	Strategic Environmental Assessment
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 Plans (FRMPs) by the end of 2015.

This report assesses the FRMPs for Spain (ES)<sup>1</sup>. 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 FRMPs<sup>2</sup> 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 Spain, the assessment has focused on a selected set of plans, chosen to cover a broad range of methodological approaches and different Units of Management (UoMs). The following FRMPs were reviewed:
  - One for a UoM managed at national level (ES080, Júcar);
  - Four UoMs managed at regional level: ES014, Galicia; ES017, Eastern Cantabrian, partially managed by the Basque Country authorities; ES060, Andalusian Mediterranean Basins, managed by the Andalusian authorities; and ES110, Balearic Islands.

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<sup>1</sup> 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.

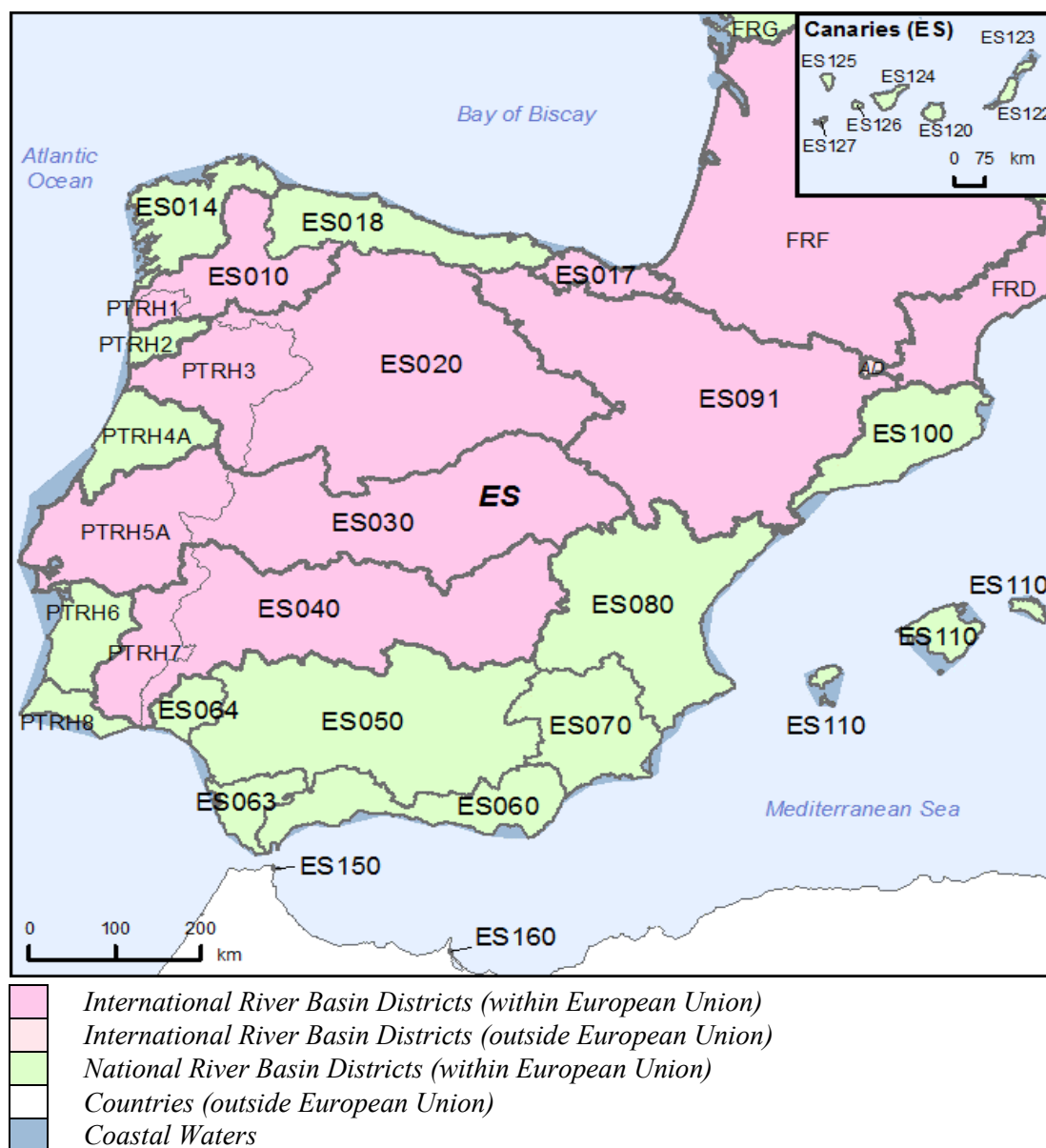
<sup>2</sup> Referred to as “Reporting Sheets” throughout this report. Data must be reported in a clear and consistent way by all Member States. The format for reporting was jointly elaborated by the Member States and the Commission as part of a collaborative process called the “Common Implementation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

[http://ec.europa.eu/environment/water/water-framework/objectives/implementation\\_en.htm](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)

Spain is divided into 25 Units of Management (UoMs), which correspond to the River Basin Districts (RBDs) under the Water Framework Directive (WFD). At the time of drafting this report, Flood Risk Management Plans (FRMPs) had been approved and reported for 17 of Spain’s UoMs<sup>3</sup>, the exceptions being the UoMs for Catalonia (ES100)<sup>4</sup> and the Canary Islands (ES120 to ES127): see the Table 1 below for an overview.

<sup>3</sup> By May 2018 the FRMP for also Catalonia, ES100 had been approved, bringing the total to 18 UoMs.

<sup>4</sup> The FRMP for ES100 (Catalonia) was approved by the Spanish Government on the 9<sup>th</sup> of March 2018. Following that, a PDF and an XML file was reported to the European Commission. This was, however, too late to be included in this report, and thus the assessment in this report does not consider that UoM.

The approach for preparing the FRMPs is similar in each UoM, based on work developed by the National Ministry for Agriculture. However, certain differences can be found when comparing the national approach with the FRMPs developed by regional competent authorities (such as Galicia, Andalusia, the Basque Country and the Balearic Islands which have been assessed for this report). The regional FRMPs also differ in the degree of detail provided.

In Spain the FRMPs were adopted by Royal Decree:

- The FRMPs for ES010, 20, 30, 40, 50, 70, 80, 91, 150 and 160 – by Royal Decree 18/2016 on 15 January 2016
- ES014, RD 19/2016, 15 January 2016
- ES017 and 18, RD 20/2016, 15 January 2016
- ES060, 63 and 64, RD 21/2016, 15 January 2016
- ES110, RD 159/2016, on 15 April 2016

The table below gives an overview of all UoMs in Spain, including the UoM code, the name, and the number of APSFRs reported<sup>5</sup>. It also shows if the UoM reported all documents required to European Environment Agency’s (EEA) WISE<sup>6</sup> – the FRMP as a PDF and the reporting sheet as an XML.

**Table 1** *Overview of UoMs in Spain*

UoM	Name	Number of APSFRs	XML reported	PDF Reported
ES010	MINHO-SIL	24	Yes	Yes
ES014	GALICIAN COAST	207	Yes	Yes
ES017	EASTERN	73	Yes	Yes
ES018	WESTERN	110	Yes	Yes
ES020	DOURO	26	Yes	Yes
ES030	TAGUS	33	Yes	Yes
ES040	GUADIANA	45	Yes	Yes
ES050	GUADALQUIVIR	109	Yes	Yes
ES060	ANDALUSIAN	204	Yes	Yes
ES063	GUADALETE-BARBATE	42	Yes	Yes
ES064	TIONTO-ODIEL-	34	Yes	Yes
ES070	SEGURA	35	Yes	Yes
ES080	JUCAR	58	Yes	Yes
ES091	EBRO	46	Yes	Yes

<sup>5</sup> Since the reporting of APSFRs (October 2014), there have been changes in Spain’s APSFRs, which will be reflected when Spain reports their PFRA/APSFRs in the 2nd cycle of the Floods Directive. Spain has provided the following updated numbers of APSFRs: ES014, 210; ES040, 43; ES050, 110; ES060, 200; ES063, 44; ES064, 35; ES070, 44; ES100, 42; ES124, 45; ES160, 5; Total, 1342

<sup>6</sup> <http://rod.eionet.europa.eu/obligations/603/deliveries?id=603&tab=deliveries&d-4014547-p=1&d-4014547-o=2&d-4014547-s=3>



<b>UoM</b>	<b>Name</b>	<b>Number of APSFRs</b>	<b>XML reported</b>	<b>PDF Reported</b>
ES100	INTERNAL BASINS OF	29	Yes <sup>2</sup>	Yes <sup>2</sup>
ES110	BALEARIC ISLANDS	43	Yes	Yes
ES120	GRAN CANARIA	47	No	No
ES122	FUERTEVENTURA	34	No	No
ES123	LANZAROTE	37	No	No
ES124	TENERIFE	33	No	No
ES125	LA PALMA	12	No	No
ES126	LA GOMERA	7	No	No
ES127	EL HIERRO	7	No	No
ES150	CEUTA	7	Yes	Yes
ES160	MEILILLA	4	Yes	Yes
TOTAL		1 306	18 <sup>2</sup>	152 <sup>2</sup>

The FRMPs can be downloaded from the following web page:

[http://www.mapama.gob.es/es/agua/temas/gestion-de-los-riesgos-de-inundacion/planes-gestion-riesgos-inundacion/Enlace\\_documentacion\\_PGRI.aspx](http://www.mapama.gob.es/es/agua/temas/gestion-de-los-riesgos-de-inundacion/planes-gestion-riesgos-inundacion/Enlace_documentacion_PGRI.aspx)

## Overview of the assessment

Table 2 below gives an overview of the evidence found during the assessment of the FRMP. 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
<b>FRM objectives have been established</b>	Strong evidence	The FRMPs assessed include a list of established objectives
<b>FRM objectives relate to...</b>		
...the reduction of potential adverse consequences	Strong evidence	This aspect is specified in the definition of objectives in the FRMPs
...to the reduction of the likelihood of flooding	Some evidence	The objectives of the FRMPs aim to reduce the vulnerability and risk to flooding; however, without further specification.
...to non-structural initiatives	Strong evidence	This aspect is specified in the definition of objectives in the FRMPs
<b>FRM objectives consider relevant potential adverse consequences to...</b>		
...human health	Some evidence	These aspects are specified in the definition of objectives in the FRMPs, at an overall level (aim of the FRMPs), but not in detail within what the Spanish FRMPs denominate as the “general objectives”. UoM-specific objectives have only been defined in one UoM out of the five assessed.
...economic activity	Some evidence	These aspects are specified in the definition of objectives in the FRMPs at an overall level (aim of the FRMPs), but not in detail within the general objectives, where economic activity is mentioned twice

<b>Criterion</b>	<b>Evidence</b>	<b>Comments</b>
...environment	Some evidence	These aspects are specified in the definition of objectives in the FRMPs, and one of the general objectives includes the contribution to the achievement of the WFD objectives. However, the environment is only mentioned once in the text of the other general objectives
...cultural heritage	Some evidence	Cultural heritage is not explicitly specified in the definition of objectives in the FRMPs, though mentioned in the higher level, that of the aim of FRMPs
<b>Measures have been...</b>		
...identified	Strong evidence	The FRMPs include a set of measures, including those that have been started in the past and others that are new.
...prioritised	Strong evidence	Measures have been prioritised according to four criteria, namely: 1. a ranking of the objectives according to their relevance, developed in some of the UoMs explicitly (Galicia, ES014) after technical and stakeholder meetings 2. a cost-benefit assessment of the measures (which is not further described) 3. a comparison of the geographical extent of the measure implementation, prioritising those measures that cover a wider geographical range 4. beneficial links with the implementation of related EU legislation, in particular the Water Framework Directive
<b>Relevant aspects of Article 7 have been taken into account such as...</b>		
...costs & benefits	Some evidence	The FRMPs refer to cost benefit assessment as a criterion for the establishment of priorities for the selection of measures. However, they do not report further details nor provide evidence of such assessments, neither in general nor specifically for the measures. The FRMP Eastern Cantabrian, ES017, also reports that no transboundary measures are planned and thus no cost-benefit assessment of such measures has been undertaken.

<b>Criterion</b>	<b>Evidence</b>	<b>Comments</b>
...flood extent	Strong evidence	The flood extent is described for each APSFR in the corresponding fiche. According to the reported information, the information on the flood extent has been used to define the measures.
...flood conveyance	Strong evidence	In the APSFR online viewer, conveyance routes are reflected. No reference to conveyance routes is provided in the FRMP summary of the APSFRs for Galicia, ES014. In the FRMPs for the Eastern Cantabrian (ES017), Andalusian Mediterranean Basins (ES060) and Júcar (ES080), conveyance routes were not explicitly mentioned as an element of the APSFRs at the PFRA phase, but reference is made to river beds, which can be considered as one, albeit obvious, conveyance route.
...water retention	Some evidence	Natural Water Retention Measures – e.g. for river restoration – are included in the FRMPs assessed, though detailed description and target indicator values are often not available; moreover, few NWRMs have been included so far in the budgets for the implementation of the measures of the FRMPs.
...environmental objectives of the WFD	Some evidence	The FRMPs refer to the necessary 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 NWRM including sustainable urban drainage systems (SuDS). In detail, the overlap between Flood Risk Areas and water bodies has been assessed, and in particular a summary of their status and objectives of each water body included.
...spatial planning/land use	Some evidence	All five FRMPs assessed include references to land use, as well as measures to improve coordination and to align - in particular urban, but also forestry - land use with the risks identified, preventing further damages.
...nature conservation	Some evidence	A limited number of measures refer to either biodiversity (among the FRMPs assessed, the

Criterion	Evidence	Comments
		Balearic Islands, ES110, includes measures to protect coastal dunes); nature conservation (Júcar, ES080 includes maintenance of natural reefs); or environmental improvement (Eastern Cantabrian, ES017).
...navigation/port infrastructure	No evidence	All FRMPs assessed make a brief reference that they shall take into consideration navigation and port infrastructure. However, there is no specific measure targeting these
...likely impact of climate change	Some evidence	The FRMPs refer to climate change scenarios of IPCC and other bodies, some in specific chapters on the topic. These FRMPs show clear trends for the overall decrease in precipitation, but unclear or different trends related to daily maxima of rainfall. Given these uncertainties, all FRMPs include a measure to develop further studies on the effects of climate change on flood risk, as current information is judged as insufficient. They also include measures to improve weather forecasting
<b>Coordination with other countries ensured in the RBD/UoM</b>	Some evidence	The one FRMP assessed that is part of an international UoM (Eastern Cantabrian, ES017) mentions the 2006 Toulouse Agreement between Spain and France on water management but does not provide details on coordination, despite the fact that a joint APSFR has been identified.
<b>Coordination ensured with WFD</b>	Some evidence	The FRMPs refer to the necessity of coordination between the FRMPs and RBMPs, and the obligation to foster the achievement of the WFD objectives
<b>Active involvement of interested parties</b>	Some evidence	During the drafting process of FRMPs, working groups were established with public institutions for better coordination, and information days were held in some UoMs. The FRMPs do not include a summary of the effect of the consultation.

## Good practices

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

**Table 3**      *Good practices in the Spanish FRMPs*

Topic area	Good practices identified
Integration of previously reported information in the FRMPs.	<p>Two of the five FRMPs assessed (Galicia, ES014, and Eastern Cantabrian, ES017) included explicit information about changes in APSFRs and FHRMs.</p> <p>All five FRMPs assessed included printed maps of the distribution of flood risk areas within the UoM as well as internet links to maps of all APSFRs. The Eastern Cantabrian FRMP (ES017) presents maps for each of the APSFRs in the FRMP.</p>
Setting of objectives for the management of flood risk.	<p>The objectives of the FRMPs were discussed with stakeholders before their establishment.</p> <p>In one of the five FRMPs assessed (Júcar, ES080), more detailed “specific” objectives associate the “general” objectives of the FRMPs with the APSFRs, and provide further detail for some of them (e.g. “Improve predictive capacity in flood and flood situations at the Elche dam and review its flood management protocols”).</p> <p>The FRMPs and the reporting sheets refer to coordination activities with national authorities (e.g. the Ministries for Public Works related to infrastructure construction and drainage, and for Economy and Competitiveness related to research and innovation), including for their specific measures in the Plans.</p>
Planning/implementing of measures and their prioritization for the achievement of objectives.	<p>Almost all measures are specific and measurable. All five of the FRMPs assessed include a clear and explicit description of what measures are trying to achieve, where, how and by when.</p> <p>The geographic reference is either UoM, APSFR or other, more specific (e.g. list of weirs to be removed in Júcar, ES080): for measures with a specific location, the description usually is detailed, such as providing a figure in km or other specifics. This level of geographic detail can be considered as a good practice.</p> <p>Natural Water Retention Measures – e.g. for river restoration - are included in the five FRMPs assessed, though detailed descriptions and target indicator values are often not available.</p> <p>For the five FRMPs assessed, progress in the implementation of planned measures is tracked via monitoring indicators, including quantitative baselines and targets; however, information is not provided for all the indicators.</p>
Climate change	<p>All five FRMPs assessed include a measure to develop further studies on the effects of climate change on flood risk.</p>

<b>Topic area</b>	<b>Good practices identified</b>
	Reference to the National Strategy for Climate Change Adaptation is made in four of the five FRMPs assessed.
Use of cost-benefit analysis in the FRMPs assessed	Cost benefit analysis is reported to be used as a criterion for the prioritisation of measures.
Public participation.	Technical coordination meetings with authorities, prior to the release of the draft FRMPs for consultation were held in at least four of the five UoMs whose FRMPs were assessed. The FRMPs include extensive information in their Annexes describing in detail the texts of comments received during consultation and the responses of the administrations.
Flood risk governance.	The FRMPs include extensive information in the Annexes describing in detail the text of comments received and the response texts of the administrations. Strategic Environmental Assessments were prepared for all five FRMPs assessed. In some cases, a joint Strategic Environmental Assessment has been undertaken for the RBMPs and FRMPs (Eastern Cantabrian, ES017; Andalusian Mediterranean Basins, ES060; Júcar, ES080).

## Areas for further development

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

**Table 4** *Areas for further development in the Spanish FRMPs*

<b>Topic area</b>	<b>Areas for further development identified</b>
Integration of previously reported information in the FRMPs.	There is limited information in the FRMPs on how the FHRMs have been used to prioritise measures. For one FRMPs assessed (Júcar, ES080), no internet link for APSFR maps is provided.
Setting of objectives for the management of flood risk.	The objectives are not measurable and do not specify targets to be achieved. The decision-making process for prioritization of the objectives is not described in detail in the FRMPs, and therefore the transparency of this process is not fully guaranteed (no evidence in the FRMPs).
Planning/implementation of measures and their prioritization or the achievement of objectives.	The FRMPs assessed do not consistently describe in detail either the measures, or the cost elements which are considered for the FRMP budget. Nature based solutions have only been considered very marginally in the FRMPs. It is not clear how measures will contribute to the objectives, nor by how much. The FRMPs include almost only effort (output) indicators

Topic area	Areas for further development identified
	and few impact indicators, these usually without target values for 2021; therefore, the progress in achieving the objectives will be difficult to measure.
Consideration of climate change in the FRMPs assessed.	Due to the lack and contradictions of previously existing information and studies, no clear likely impact of climate change has been identified for daily maxima of rainfalls. In consequence, no further consideration of climate change impacts has been included in the FRMPs and the establishment of measures: measures only develop further and more conclusive studies on this topic.  Coordination between FRMPs and the national climate change adaptation strategy appears not to be systematic.
Use of cost-benefit analysis in the FRMPs assessed.	The cost-benefit assessment for measures is not documented in the FRMPs, and such assessments are expected to be applied only for structural measures and during the implementation phase of FRMPs. <sup>7</sup>
Public participation.	The number of comments received during the consultation has been quite low in general. This might be due to low interest or understanding from public, or as a sign of approval regarding the contents of the FRMP.
International issues in flood risk management.	For the one FRMP assessed that is part of an international UoM (Eastern Cantabrian, ES017), no maps have been presented for the whole international UoM (ES017-FRF), including joint flood risk areas in France and Spain.

## 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):

- The process of prioritization of objectives should be better explained and documented, e.g. explaining which institutions and stakeholders have taken part in it, and which reasons have been argued to decide on high or low priorities for the different objectives.
- The achievement of the objectives of the FRMPs should be measurable to the extent possible to be able to assess progress.
- For measures, indicators of progress should be developed and linked to measurable objectives.

<sup>7</sup> Spain subsequently noted that it was considered unfeasible to carry out a cost-benefit assessment of all the measures; this will only be carried out for the structural measures during the implementation phase of the FRMPs (which has already been completed in the case of the Eastern Cantabrian FRMP, ES017). The first step is to create a guide with the relevant methodology and the second will consist of the cost-benefit assessment study and the prioritization of any interventions.



- A stronger emphasis should be placed upon the introduction of nature based solutions (including NWRM).
- 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 prioritization of the measures should be more transparent and better documented.
- Climate change should be considered, including better integration of and more systematic references to the National Climate Change Adaptation Strategy.

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

## 1.1. Reporting of the FRMP

Spain has reported 17 out of 25 FRMPs. The eight missing FRMPs<sup>8</sup> refer to ES100 (Catalonia) and the seven UoMs of the Canary Islands (ES120 to 127).

Spain did not make use of Article 13.3 of the Floods Directive, which allows Member States to make use of previous flood risk management plans (provided their content is equivalent to the requirements set out in the Directive).

Concerning the geographic coverage of the FRMPs, there is one FRMP covering each entire UoM. In addition, other documents have been reported for some of the UoMs as annexes and/or background documents.

## 1.2. Assessment of the FRMP

In Spain some river basin districts (RBDs)/UoMs are managed at a national level and others are managed at regional level (i.e. at the Autonomous Community level).

The nationally managed UoMs assessed are:

**Table 5** *Nationally managed UoMs assessed*

UoM code	UoM Name
ES017	EASTERN CANTABRIAN
ES080	JUCAR

The regionally managed UoMs assessed are:

**Table 6** *Regionally managed UoMs assessed*

UoM code	UoM Name
ES014	GALICIAN COAST
ES060	ANDALUSIAN MEDITERRANEAN BASINS
ES110	BALEARIC ISLANDS

<sup>8</sup> By May 2018 the FRMP for Catalonia, ES100 had also been approved, reducing the pending FRMPs to seven.

However, the regional Basque Country authority has taken an active role in the development of the FRMP for the Eastern Cantabrian, ES017, which therefore has a somewhat different content than other FRMPs of inter-regional (and thus nationally managed) UoMs.

Nationally managed basins/UoMs are expected to take a consistent approach: for this reason, one national FRMP significantly affected by floods (Júcar, ES080) and four UoMs managed at regional level (ES014 for Galicia; Eastern Cantabrian, ES017 for the Basque country; Andalusian Mediterranean Basins, ES060 for Andalusia; and ES110 for the Balearic Islands) were chosen for the assessment.

As neither Catalonia (ES100) nor the Canary Islands (ES120 to ES127) had reported FRMPs at the time of the assessment, it was assumed that all methodological approaches reported at the time by Spain were covered by this assessment.

## **2. Integration of previously reported information**

### **2.1 Conclusions drawn from the preliminary flood risk assessment**

The conclusions of the PRFA are presented in the FRMP for all five FRMPs assessed. This includes a summary map showing areas of potential significant flood risk (APSFRs). All FRMPs assessed also had a textual description which includes tables listing the APSFRs, the methodology employed and the results of previous steps. The information varies in detail and is shorter for Galicia (ES014) than for the other UoMs assessed<sup>9</sup>.

Links to maps of the APSFRs have been provided as URLs in the FRMPs for three UoMs – Andalusian Mediterranean Basins, ES060 and Balearic Islands, ES110 and Galicia, ES014 (however, in an Annex) – but not for the Eastern Cantabrian, ES017 or the Júcar, ES080, although for both of these overview maps are included in the FRMP.

No reference to conveyance routes is included in the FRMP summary of the APSFRs for Galicia, ES014. In the FRMPs for Eastern Cantabrian (ES017), Andalusian Mediterranean Basins (ES060) and Júcar (ES080), conveyance routes are not explicitly mentioned as an element of the APSFR<sup>10</sup> but reference is made to river beds, which can be considered as one, albeit obvious, conveyance route<sup>11</sup>.

#### **2.1.1 Coordination with neighbouring Member States on shared RBDs/UoMs Conclusions drawn from the preliminary flood risk assessment**

The only international UoM analysed in detail is Eastern Cantabrian, ES017, which includes catchments shared with France. Its only shared APSFR is ES017-GIP-BID-01 between France and Spain. However, the map included in FRMP for this UoM is unclear, and it does not appear that a shared APSFR and map have been elaborated.

Annex 5 of the FRMP for the Eastern Cantabrian UoM indicates that there is an overall coordination agreement (the 2006 Toulouse agreement) and that information exchange and cooperation have taken place, but no specific description of the exchanges is provided<sup>12</sup>.

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<sup>9</sup> FRMPs, main document.

<sup>10</sup> Spain subsequently clarified that during the development process of the PFRA, there was not enough available information to be able to define the conveyance routes (floodway). This was carried out for the risk maps.

<sup>11</sup> FRMPs chapters 3 ES017: pages 26 and 28, ES060 page: 24, ES080 page: 23.

<sup>12</sup> FRMP ES017 Annex 5.

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

There is no specific information available in the reporting sheets (across all 17 FRMPs reported), regarding the ways which the PFRA was used in developing the flood hazard and flood risk (FHR) maps.

Across the five FRMPs assessed, two FRMPs (Andalusian Mediterranean Basins, ES060, and Balearic Islands, ES110) did not provide specific information. For the three other FRMPs assessed, information is provided, but not always with sufficient detail to understand the links:

- The FRMP for Galicia, ES014, explains that the preparation of FHR maps was based on the previous PFRA and it assessed the identified areas with more detail.
- The FRMP for Eastern Cantabrian, ES017, refers to the two steps but does not describe the links in detail.
- In the Júcar FRMP, ES080, a clear reference is provided for FHR maps being based on the PFRA, but no conclusions are included in the FRMP regarding the evolution of APSFRs in between the two assessment steps<sup>13</sup>.

## 2.2 Presentation of Flood Hazard and Risk Maps (FHRMs) in the FRMPs

The flood hazard and flood risk maps have been presented in one of the five FRMPs assessed (Eastern Cantabrian, ES017). This FRMP includes maps for each APSFR, where the coastal and fluvial flood risks are reflected; the methodology informs furthermore that separate studies have been undertaken for floods from both sources and the APSFR is represented as the combined area of both individual sources. In the Galicia FRMP (ES014), a table of fluvial and coastal APSFRs is presented, but no maps. The FRMPs for the Andalusian Mediterranean Basins (ES060), Júcar (ES080), and Balearic Islands (ES110) do not include APSFR-specific maps in the FRMP itself or the corresponding annexes/appendixes.

Links to the flood hazard and flood risk maps have been provided in the FRMPs in some but not all FRMPs assessed. Specifically:

- FRMP for Galicia, ES014: internet links for maps are provided in Annex 1, page 34, which refers to <http://www.cmati.xunta.es/ide-dhgc/> and the National flood risk mapping system <http://sig.magrama.es/snczi/>
- FRMP for Eastern Cantabrian, ES017<sup>14</sup>: maps of the APSFR are at <http://www.uragentzia.euskadi.net/u81-0003/es/contenidos/informacion/mapas-de-peligrosidad-y-riesgo-cantabrico-oriental-en-el-ambito-de-las-cuencas-internas-de-la->

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<sup>13</sup> FRMP ES014 page: 33, FRMP ES017 page: 33. No information is provided for ES060 nor ES110 FRMP, ES080 page: 31.

<sup>14</sup> FRMP ES017, page 35.

[capv/demarcacion-cantabrico-oriental/es\\_docu/demarcacion-cantabrico-oriental.html](http://www.chcantabrico.es/index.php/es/actuaciones/dph/evaluacion-y-gestion-de-los-riesgos-de-inundacion/mapas-de-peligrosidad-y-riesgo/dh-del-cantabrico-oriental)  
<http://www.chcantabrico.es/index.php/es/actuaciones/dph/evaluacion-y-gestion-de-los-riesgos-de-inundacion/mapas-de-peligrosidad-y-riesgo/dh-del-cantabrico-oriental>

- FRMP for Andalusian Mediterranean Basins, ES060<sup>15</sup>: reference to the map viewer is provided <http://www.cma.junta-andalucia.es/medioambiente/site/portalweb/>
- FRMP for Júcar, ES080<sup>16</sup>: general link to the National System (<http://sig.magrama.es/snczi/>)
- Balearic Islands, ES110<sup>17</sup>: Links are not provided to a map, but to fichas of the fluvial FRAs:  
<http://www.caib.es/sacmicrofront/archivopub.do?ctrl=MCRST259ZI158962&id=158962>  
And of the coastal FRAs:  
<http://www.caib.es/sacmicrofront/archivopub.do?ctrl=MCRST259ZI158964&id=158964>  
<http://www.caib.es/sacmicrofront/archivopub.do?ctrl=MCRST259ZI158965&id=158965>

Floods from pluvial, groundwater and artificial water bearing infrastructure sources have not been identified in the UoMs assessed; The FRMPs do not include references to these flood sources. None of these sources had been identified in the previous FHRM phase<sup>18</sup>.

### 2.2.1 Maps for shared flood risk areas

Flood hazard and flood risk maps have not been prepared for flood risk areas shared with other Member States, in the one transboundary river basin/UoM assessed. As noted above, the only shared APSFR is ES017-GIP-BID-01 between France and Spain. However, the map included in the FRMP for the Eastern Cantabrian, ES017 (Annex 1), is unclear, and it does not appear that a shared map has been elaborated<sup>19</sup>. This FRMP does refer to information exchange, without being specific on the moment or content of such exchanges. Neither the FRMP's main nor its Annex 5 (on information exchange) refers to active transboundary cooperation on the preparation of the maps. The reporting sheets (for the Eastern Cantabrian, ES017, and the Adour-Garonne UoM in France, FRF) and the FRMP for the Eastern Cantabrian, ES017 (main document), do not include information on this topic.

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<sup>15</sup> FRMP ES060, page 33.

<sup>16</sup> FRMP ES080, page 28.

<sup>17</sup> FRMP ES110, page 20.

<sup>18</sup> FRMPs and annexes: ES014 Annex 1 ES017 Annex 1 page: 28.

<sup>19</sup> FRMP ES017, page 331 (pdf page number).

### 2.2.2 Conclusions drawn from the flood hazard and flood risk maps

In all the FRMPs, Flood hazard and risk maps (FHRMs) have been used to develop the FRMPs. 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 participation process
- Measure types and locations have been defined based on the FHRM

The approach varies, however, across the FRMPs assessed and in general limited detail has been provided on how the FHRMs have been used to develop FRMPs. In general, all FRMPs refer in a standard text to the relevance of the FHRM exercise and its results for the definition of the FRMP. In three out of five assessed FRMPs (Galicia, ES014; Eastern Cantabrian, ES017; and Balearic Islands, ES110), the FHRMs have been used to prioritise the locations for flood risk measures. The other two assessed FRMPs do not provide conclusions on the use of the FHRMs for the development of FRMPs. For example<sup>20</sup>:

- The Galicia (ES014) FRMP refers to an analysis carried out in the frame of the FRMP drafting on which measures would be applicable to each of the APSFRs and the FRMP page 35 refers to the maps being submitted to public consultation<sup>21</sup>.
- The Eastern Cantabrian (ES017) FRMP refers to the FHRMs as a basis for considering measures with criteria of benefit and sustainability<sup>22</sup>. In the chapter referring to the FHRMs, but not its conclusion, the FRMP states briefly that the results of the mapping exercise help to prioritize measures both within one flood risk areas and between flood risk areas<sup>23</sup>.
- The FRMP for the Andalusian Mediterranean Basins, ES060, only provides a list of the APSFRs without defining other type of conclusions<sup>24</sup>.
- The Júcar (ES080) FRMP does not provide conclusions from the FHRM exercise<sup>25</sup>.
- The FRMP for the Balearic Islands, ES110: Chapter 4.5 includes a summary description of the assessment, providing overall data on the population or economy affected, etc. and states that the exercise has determined the measures and priorities for the implementation; but does not specify how the results influence objectives or measures in

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<sup>20</sup> The assessment has not tracked back possible references to the FHRM from the latter chapters of the FRMPs, such as on objectives or measures; and has been limited to the chapter on FHRM.

<sup>21</sup> FRMP ES014, page 44.

<sup>22</sup> FRMP ES017, page 56.

<sup>23</sup> FRMP ES017, page 33.

<sup>24</sup> FRMP ES060, page 39 and following.

<sup>25</sup> FRMP ES080, page 40 and following.

detail<sup>26</sup>. The FRAs with the highest risks have been prioritised for the implementation of measures<sup>27</sup>.

### 2.3 Changes to the APSFRs or other Flood Risk Areas

Any changes in the identification of Areas of Potential Significant Flood Risk since December 2011 should be reflected in the FRMP. Out of the five FRMPs assessed, three (Andalusian Mediterranean Basins, ES060; Júcar, ES080; and Balearic Islands, ES110) do not provide details regarding possible changes to the APSFRs due to increased information, knowledge and understanding. However, in two FRMPs such references have been found and they cite changes in the number of flood risk areas (in particular for floods from coastal sources: Galicia, ES014) and the maps combining flood risks from different sources (Eastern Cantabrian, ES017). In detail:

- The Galicia (ES014) FRMP refers to the fact that the number of preliminary coastal APSFRs increased from 39 to 42, due to a better simulation of flood risks, however, according to the FRMP, 14 of these do not present real flood risks<sup>28</sup>.
- The Eastern Cantabrian (ES017) FRMP refers to changes in the APSFRs due to coastal sources, where new areas have been included and others discarded due to the additional information available<sup>29</sup>. Furthermore, for APSFRs with combined sources, these have been reflected in a map as a “combined area”<sup>30</sup>.
- The Andalusian Mediterranean Basins (ES060) FRMP does not provide any insights concerning possible changes<sup>31</sup>.
- The Júcar (ES080) FRMP: Chapter 4 describes the methodology and results of the different risk factors considered (including surface area, depth, velocity, response time, sediment transport, obstacles in conveyance route) but does not inform about possible changes due to improved knowledge base.
- The Balearic Islands (ES110) FRMP does not provide any insights concerning possible changes

No information was found regarding in the FRMPs whether any changes were made regarding the preparation of Flood Hazard and Flood Risk Maps since December 2013 (the Directive’s deadline for the FHRMs).

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<sup>26</sup> FRMP ES110, page 30.

<sup>27</sup> FRMP ES110, page 31.

<sup>28</sup> FRMP ES014, page 33.

<sup>29</sup> FRMP ES017, page 48.

<sup>30</sup> FRMP ES017, page 47.

<sup>31</sup> FRMP ES060, page 32 and following.



## 2.4 Areas for further development in the earlier assessment of the flood hazard and risk maps

The FHRM assessment<sup>32</sup> identified the following substantive areas for further development for Spain:

- Several FHRMs were reported to be still under development.
- It was not clear whether Emergency Actions plans for dams already correspond to the requirements of the Directive, if not whether Spain considered adapting those plans to the Directive's requirements.

None of these areas for further development are explicitly addressed within the FRMPs assessed or the reporting in the time period between publication of the FHRMs and the assessment of the FRMPs. Nonetheless, the following information has been found:

- For the FRMPs assessed, the FHRMs had been completed – however, information was not available regarding the FRMPs not reported: Catalonia (ES100) and the Canary Islands (ES120 to ES127).
- Emergency Action Plans are mentioned as measures of the FRMPs, coordinated by the corresponding competent authorities<sup>33</sup>.

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

The following **good practices** were identified:

- Inclusion in two FRMPs (Galicia, ES014, and Eastern Cantabrian, ES017) of explicit information about changes in the APSFRs and FHRMs.
- Inclusion of printed maps of the distribution of APSFRs within the UoM as well as internet links to maps of all APSFRs. The Eastern Cantabrian FRMP (ES017) presents maps for each of the APSFRs in the FRMP.

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

- For one FRMP assessed (Júcar, ES080), no internet links to AFPSFR maps are provided.
- There is limited detail in the FRMPs on how the FHRMs have been used for the development of FRMPs.

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<sup>32</sup> European Commission, Assessment of Flood Hazard and Flood Risk Maps – Member State Report: ES – Spain, November 2014. Available at: [http://ec.europa.eu/environment/water/flood\\_risk/pdf/fhrm\\_reports/ES%20FHRM%20Report.pdf](http://ec.europa.eu/environment/water/flood_risk/pdf/fhrm_reports/ES%20FHRM%20Report.pdf)

<sup>33</sup> Emergency Action Plans are mentioned as measures of the FRMPs, coordinated by the corresponding competent authorities. Reporting sheets.

## 3 Setting of Objectives

### 3.1 Focus of objectives

The eight general objectives of all FRMPs in Spain are:

- Increase perception of flood risk and self-protection strategies by the population, social and economic agents;
- Improve administrative coordination among all actors involved in risk management;
- Improve knowledge for adequate flood risk management;
- Improve predictive capacity in flood and flood situations;
- Contribute to improving spatial planning and management of exposure in flood areas;
- Achieve a reduction, as far as possible, of the risk by reducing the danger to human health, economic activities, cultural heritage and the environment in flood areas;
- Improve resilience and reduce the vulnerability of elements located in flood areas;
- Contribute to the improvement of the water body status, and coordination with the WFD.

These objectives apply to the five FRMPs assessed. Consequently, in the FRMPs assessed<sup>34</sup>:

- The objectives aim to reduce the adverse consequences of floods;
- The objectives aim to reduce the likelihood of flooding<sup>35</sup>;
- The objectives refer to measures that will be implemented;
- The objectives refer to non-structural measures<sup>36</sup>.

### 3.2 Specific and measurable objectives

In Spain, objectives are neither specific nor measurable. The “general” objectives for the FRMPs are not specific on what they are trying to achieve (not quantitative or measurable), where they are to be achieved, and by when they are expected to be achieved. There is some information available how they are to be achieved.

In all FRMPs assessed, indicators are provided associated to measures, but not associated directly to the objectives (note there is not a direct and explicit relationship between objectives and measures, as the measures contribute usually to several objectives). Almost exclusively,

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<sup>34</sup> These categories are included in Article 7 of the Floods Directive.

<sup>35</sup> The assessment adopts the generally accepted definition of risk as a product of consequence times likelihood, thereby also in alignment with Article 7(2) of the FD.

<sup>36</sup> Non-structural measures include measures such as flood forecasting and raising awareness of flooding as well as land use planning, economic instruments and insurance.

they are effort (output) indicators (e.g. number of so-called “management agreements” undertaken to carry jointly out certain measures), and not impact indicators. The indicators are defined for 2015 (baseline) and 2021 (targets). Furthermore, such targets are not defined for all measures (e.g. Andalusian Mediterranean Basins, ES060, FRMP): many of the indicators listed (in the template provided to the UoM authorities by the National authorities) “do not apply” or are “not defined”. In some UoMs (so far out of the assessed UoMs, only developed for Júcar, ES080), more detailed “specific” objectives associate the general objectives with the APSFRs, and provide further detail for some of them (e.g. “Improve predictive capacity in flood and flood situations at the Elche dam and review its flood management protocols”).

### **3.3 Objectives to reduce adverse consequences from floods**

In the FRMPs assessed, objectives do not provide further specification of the type of adverse consequences that will be reduced. As mentioned previously, the objectives are rather general and do not specify the targets to be achieved. None of the many indicators established for measures focus on impacts, but rather on efforts.

### **3.4 Objectives to address the reduction of the likelihood of flooding**

The objectives aim to reduce the vulnerability and risk to flooding; however, without further specification.

### **3.5 Process for setting the objectives**

Each of the five FRMPs assessed sets out priorities by ranking the eight general objectives determined nationwide (see above) for the specific circumstances of the UoM. The FRMPs and the reporting sheets also refer to coordination activities between different national authorities (as the Ministry for Public Works, related to infrastructure construction and drainage, and the Ministry for Economy and Competitiveness, related to research and innovation). All FRMPs have undergone a consultation process.

### **3.6 Good practices and areas for further development regarding setting objectives**

The following **good practices** were identified:

- The objectives of the FRMPs were coordinated at national or regional level and discussed with stakeholders before their establishment
- In one of the UoMs assessed (Júcar, ES080), more detailed “specific” objectives associate the “general” objectives of the FRMPs with the APSFRs, and provide further

detail for some of them (e.g. “Improve predictive capacity in flood and flood situations at the Elche dam and review its flood management protocols”).

- The FRMPs and the reporting also refer to coordination activities between the different national authorities (e.g. the Ministries for Public Works related to infrastructure construction and drainage, and Economy and Competitiveness related to research and innovation), including their specific measures in the Plans.

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

- The objectives are not measurable and do not specify the targets to be achieved.
- The decision-making process for prioritization of the objectives is not described in detail in the FRMPs.

## 4 Planned measures for the achievement of objectives

For all UoMs that have been reported (17 UoMs<sup>37</sup>), including the five UoMs whose FRMPs have been assessed, the total number of individual measures is 192, and the number of aggregated<sup>38</sup> measures is 1 171. In consequence, the total number of measures is 1 363 (the FRMPs do not explain how individual and aggregated measures are defined). The average number of measures per UoM is 80, with a range between 49 and 156 measures per UoM<sup>39</sup>.

The 17 FRMPs reported each contain most of the measure types<sup>40</sup> defined. However, prevention measures of types 22<sup>41</sup> are only present in some of the UoMs. Moreover, the measure types 35<sup>42</sup>, and 52<sup>43</sup> are not included in any of the FRMPs of the Spanish UoMs.

For all 17 UoMs reported, in terms of the number of measures associated, Protection measures are in the majority, with 404 measures (30 %). These are followed by Preparedness (358 measures or 26 %), Prevention (327 measures or 24 %) and Recovery and review measures (274 measures or 20 %).

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

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<sup>37</sup> All Spanish UoMs, excluding ES100 and ES120 to 127, as these were not reported at the time of the assessment.

<sup>38</sup> 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.

<sup>39</sup> 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.

<sup>40</sup> See Annex B for the list of all measure aspects and measure types.

<sup>41</sup> Measure to remove receptors from flood prone areas, or to relocate receptors to areas of lower probability of flooding and/or of lower hazard) and 23 (Measure to adapt receptors to reduce the adverse consequences in the event of a flood actions on buildings, public networks, etc.

<sup>42</sup> Other measure to enhance protection against flooding, which may include flood defence asset maintenance programmes or policies.

<sup>43</sup> Environmental recovery, clean-up and restoration activities.

## 4.1 Cost of measures

**Table 7 Overall budget for the measures in the assessed FRMP**

UoM	Estimated overall budget of planned measures (2015-2021) in EUR
ES080	74.5 m
ES110	5.42 m
ES017	137.17 m
ES014	67.86 m
ES060	-

*Source: Reporting sheets and FRMP*

For the five FRMPs assessed, the expected costs or budget for implementing the measures are very different for the UoMs, as shown above. Its distribution amongst the categories of Prevention, Protection, Preparedness and Recovery is also very different, with Prevention ranging from 22-78 %, Protection from 14-62 %, Preparedness from 5-19 % and Recovery from 0-16 % of the total FRMP budget for the UoM.

For the FRMPs assessed, some present an overall cost forecast or budget, whilst the Andalusian Mediterranean Basins FRMP (ES060) only presents these for the separate measures and does not provide an overview.

- The Júcar (ES080) FRMP<sup>44</sup> describes the following budget distribution: Prevention 31%, Protection 34 %, Preparedness 19 %, and Recovery 16 %
- The Balearic Islands ES110 FRMP<sup>45</sup> includes the following proportional distribution of the total budget: Prevention 78,25 %, Protection 14,37 %, and Preparedness 7,38 %. No budget foreseen for Recovery. According to the Galicia (ES014) FRMP<sup>46</sup>, the distribution is Prevention 22,95 %, Protection 62,43 %, Preparedness 5,78 % and Recovery 8,84 %.
- The FRMP for Galicia (ES014)<sup>47</sup> states that part of the budget included in the FRMP will not necessarily be executed. This is due to the fact that flood investments are risk-related, and might not necessarily occur
- The Eastern Cantabrian (ES017) FRMP includes a different presentation of the budget to the other UoMs assessed, with no overall figure specified, but figures (in million EUR) for the first two planning cycles (2015-2021, 2021-2027) referring to the four areas: Prevention first: 16.59M EUR, second: 9.32M EUR, Protection first: 98.73, second:

<sup>44</sup> FRMP ES080, page 242.

<sup>45</sup> FRMP ES110, page 87.

<sup>46</sup> FRMP ES014, page 146.

<sup>47</sup> FRMP ES014, page 134.

269.5, Preparedness first: 11.05, second: 0. Recovery and evaluation: first 10.8, second: 0.

- In the FRMP for the Andalusian Mediterranean Basins, ES060, no budget has been identified overall, and figures are only available measure by measure<sup>48</sup>.

The FRMPs assessed do not describe in detail either the measures, or the cost elements which are considered for the FRMP's budget<sup>49</sup>.

## 4.2 Funding of measures

All five FRMPs assessed explain that the majority of the budget will be covered by the national and regional competent and cooperating authorities, as well as from local authorities, most of these co-funded by EU budgets (structural and cohesion funds, agricultural and fishery funds, social funds, according to the Partnership Agreement and its priorities). Some of the measures do not require “additional budget”, as they are considered core activities of the Spanish administration already. Private sources might come from activities under the corporate social responsibility (CSR) activities of private foundations.

**Table 8** *Funding of measures*

	ES080	ES017	ES014	ES110	ES060
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					
European Social Fund	✓	✓		✓	✓

*Source: FRMPs*

## 4.3 Measurable and specific (including location) measures

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

- What they are trying to achieve,

<sup>48</sup> FRMP ES060, page 103.

<sup>49</sup> Spain subsequently informed that this information is contained in annex 2 of the FRMPs.

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

In general, the FRMPs include information on the measures which refer to their location (it can be the whole UoM or other more detailed locations), the timeframe for the implementation, the budget, the responsible authority and indicators for management. However, not all the information is provided for all measures; the gaps relate particularly to the budget (for measures considered as those which are already being carried out by the authorities in the frame of flood-related policies). In addition, the descriptions of the measures remain rather brief for example “Development and implementation of the river conservation programme” (Júcar, ES080) or for “agreements with third parties” (Balearic Islands, ES110). In the Spanish FRMPs assessed, measures are presented with a standard template table, with key information such as responsible administration, time for implementation (start, end), budget, location/geographic scope. However, it should be noted that the information in the tables is rather limited.

The measures indicate one of three levels of location: National, RBD/UoM and APSFR (or more detailed than a single water body).

**Table 9**      *Location of measures*

	All UoMs assessed
International	
National	✓
RBD/UoM	✓
Sub-basin	
APSFR or other specific risk area	✓
Water body level	
More detailed than water body	✓

*Source: Reporting sheets*

Almost all measures are specific and measurable. As stated before, for measures with a detailed location, the description usually is more detailed in terms of providing a figure in kilometres, etc. The geographic reference is either UoM, APSFR or more specific (e.g. list of weirs to be removed in Júcar, ES080). There are no differences between the assessed UoMs regarding the level of specificity of the measures<sup>50</sup>.

<sup>50</sup> FRMPs, e.g. Júcar, ES080 Annex 2 page 9.



## **4.4 Measures and objectives**

It is not clear how measures will contribute to the achievement of objectives, nor clear by how much they will contribute. It is also not clear whether the objectives will be achieved when all measures are completed. The measures have associated indicators that monitor the effort, but not the impact. Additionally, the (general) objectives established in the FRMPs are not measurable (see section 3 above). For these reasons, it is not possible to assess progress against objectives.

## **4.5 Geographic coverage/scale of measures**

For all 17 UoMs reported prior to 2017, with 1 363 measures reported, 857 apply to the whole UoM, and 503 to an APSFR. Three measures target more specific locations. Whilst the majority of measures addressing Prevention, Preparedness and Recovery target the UoM, the majority of measures addressing Protection are foreseen at the APSFR level. For further data, see Tables A6 and A7 in Annex A.

While Spain reported on the geographic scale of measures, it did not report information on the geographic coverage of the expected impact of measures.

## **4.6 Prioritisation of measures**

The vast majority of measures are categorised as either of very high or critical priority, especially for preparedness and prevention measures. Protection measures are the lowest in the scoring of the number of critical measures, whilst there are most critical measures for Prevention, followed by Preparedness and Recovery. The only measures categorised as low (one measure) or moderate (five measures) are protection measures. It is worth noting that the Andalusian Mediterranean Basins, ES060, has the highest proportion of critical priority measures of all UoMs. For further data on all 17 UoMs, please see Tables 8 and 9 in Annex A.

The five FRMPs assessed do not include summaries on the distribution of the number of measures according to the priorities. The summary of the Programme of Measures in the FRMPs refers to the main priorities in text form or table form for the Andalusian Mediterranean Basins (ES060) FRMP<sup>51</sup>; and Eastern Cantabrian (ES017) FRMP (referring only to Structural Measures)<sup>52</sup>; Júcar (ES080) FRMP<sup>53</sup>; Balearic Islands (ES110) FRMP<sup>54</sup>; the

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<sup>51</sup> ES060 FRMP, page 97 and following.

<sup>52</sup> FRMP ES017, page 150.

<sup>53</sup> FRMP ES080, page 236.

<sup>54</sup> FRMP ES110, page 74.

Galicia (ES014) FRMP<sup>55</sup>, indicating the priority measures. These summaries do not, however, include the full priority classification for critical, very high, high, moderate and low priorities.

According to the FRMPs assessed, the prioritisation of measures has followed four criteria:

- 1) a ranking of the objectives according to their relevance, developed in some of the UoMs explicitly (e.g. Galicia, ES014) after technical and stakeholder meetings,
- 2) a cost-benefit assessment of the measures (which is not further described),
- 3) a comparison of the geographical extent of the measure implementation, prioritising those measures that cover a wider geographical range,
- 4) beneficial links with the implementation of related EU legislation, in particular the Water Framework Directive.

All the FRMPs assessed and the reporting summaries include the same standard text, referring to the fact that similarity of the prioritisation results under criteria 1 and 2 are similar for the UoMs. No details are provided on the discussions at the meetings for fixing criteria 1, nor the cost benefit assessment of the measures.

For the five FRMPs assessed, the timetable for the implementation of the measures is provided within the FRMPs, and specifies the start and end month and year, in the first planning cycle. Most of the measures will be implemented in the 2015-2021 period, with a target to be achieved in 2021. In general, the majority of measures refers to six years of implementation; this indication is however not based on a detailed assessment. There does not seem to be an immediately clear relationship between the timetable and the priorities.

#### **4.7 Authorities responsible for implementation of measures**

For all 17 FRMPs reported, Spain reports that national authorities (Ministry of Agriculture, Food and the Environment, Ministry for Public Works) are responsible for the implementation of the majority of measures (760 measures), regional authorities are responsible for the implementation of 337 measures, local/municipal authorities are responsible for the implementation of 37 measures, and other bodies for the implementation of 229 measures. Note that the UoM authorities are either national or regional (see the overview for details).

Across the four measure aspects (Prevention, Protection, Preparedness, Recovery), the national authorities are in all cases responsible for the highest number of measures. However, local authorities play a more significant role dealing with prevention measures compared to other types of measures, and other bodies (such as research institutes, e.g. as identified in Eastern Cantabrian, ES017) for measures for preparedness. This observation relates to the number of

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<sup>55</sup> FRMP ES014, page 128 and following.

measures rather than the budget. For further information, please see Tables A10 and A11 of Annex A.

#### **4.8 Progress of implementation of measures**

For all 17 FRMPs reported, the vast majority of the measures are on-going for all aspects, either as process or construction. Regarding protection measures, approximately 25 % of them has not yet started, and also a significant proportion (approx. 10 %) of recovery measures has not yet started. No measures have been completed so far. For further information, please see Tables A12 and A13 of Annex A.

#### **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: Spain has reported this information for all FRMPs assessed. All FRMPs refer to the RBMPs under the WFD, and in the case of Balearic Islands, ES110, also to coastal and maritime protection (referring to the Spanish Coastal Law). Several protection measures refer to civil protection measures, e.g. Galicia, ES014, and Eastern Cantabrian, ES017.

For Spain, 159 different reported measures are reported under other Community Acts. Note however, that the legislation reported includes National or Regional acts for example covering urban land use management, forestry and road infrastructure, without providing any corresponding references to the EU act. It also refers to Horizon 2020, under the research policy of the EU.

#### **4.10 Specific groups of measures**

With regard to **spatial planning/land use measures**, the following types of measures are included in the five FRMPs assessed:

- a) Administrative coordination for construction in the floodplains, according to the compulsory reports by UoM authorities for urban development plans;
- b) Adoption of regional and urban regulation of land use limitations in the “areas of preferential flows” (a possible synonym for “conveyance routes”) and floodplains;
- c) Adoption of protocols and agreements between authorities;
- d) Coordination of flood risk information in the map viewers;
- e) Adaptation of urban planning;
- f) Development of technical construction guidance documents to reduce vulnerability and increase resilience against floods in buildings, agricultural holdings and networks;
- g) Training and awareness raising campaigns on the measures addressing vulnerability.

The framework has evolved since 2000. According to Art.11 of the Water Law, the UoM authorities transfer information on floodplains and flood risk to municipalities for consideration in urban planning. Further regulation and limitations can be established by the national and regional governments. Art. 15 of Royal Decree 903/2010 (Evaluation and management of flood risk) establishes that urban planning has to respect the regulatory elements of FRMPs and shall recognise the rural character of flood risk areas. Annex A includes the adaptation of urban planning to FRMPs in the list of measures.

**Natural water retention measures (NWRMs)** have been planned in some, but not all, of the five FRMPs assessed. Natural water retention measures are mentioned explicitly in the summary reporting of the FRMPs (although no detailed explanation is given). The following specific measures have been identified in the FRMPs assessed, with only one NWRM (flood mitigation area in Júcar, ES080) explicitly planned:

- The Galicia (ES014) FRMP<sup>56</sup> establishes within the indicators that in 2015 no NWRM was implemented in the UoM, and that the target indicator for 2022 is still to be determined.
- The Eastern Cantabrian (ES017) FRMP includes in Annex 2 information on NWRM including some schema on possible types for bio-retention (unclear which NWRM category). However, the FRMP page 200 indicates that the target indicator for NWRM is “not applicable”, thus it remains uncertain if such measures will be implemented. The relevance of floodplain conservation has been assessed.
- The FRMP for the Andalusian Mediterranean Basins (ES060) explains that a 2 m€ budget is foreseen for the first planning cycle for river restoration projects including NWRM (category Nature, hydrology-forestry and agro-hydrology)<sup>57</sup>. However, the indicator table on NWRM is blank regarding the status and target.
- The Júcar FRMP (ES080) Annex 2 includes a measure “Área de laminación en el Barranco Hondo” (Flood mitigation area in the Barranco Hondo creek; unclear which NWRM category)
- The Balearic Islands (ES110) FRMP<sup>58</sup> includes the preparation of river restoration projects including aspects of NWRM (category N), however, no specific reference has been found to underpin that such measures will be implemented.

**Measures that specifically consider nature conservation.** All five FRMPs assessed refer in a generic manner to biodiversity, e.g. the EU 2020 Biodiversity Strategy, by using a common text. At a more measure-specific level, the following references have been found:

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<sup>56</sup> FRMP ES014, page 155.

<sup>57</sup> FRMP ES060, page 108 and page 121.

<sup>58</sup> FRMP ES110, page 79.

- The FRMP for Galicia (ES014) refers to biodiversity in the measure description for river restoration measures.
- The FRMP for Eastern Cantabria (ES017) refers to Natura 2000 in the measure description of river restoration measures, e.g. referring to the competent authorities. Biodiversity is not referred to.
- The FRMP for the Andalusian Mediterranean Basins (ES060) refers to biodiversity in the frame of river restoration projects, as well as to Natura 2000 and the related regulatory references.
- The Júcar FRMP (ES080) - no reference has been found to biodiversity of Natura 2000.
- The FRMP for the Balearic Islands (ES110) neither refers to biodiversity nor to Natura 2000 when describing the measures<sup>59</sup>.

All five FRMPs assessed make a brief reference that they shall take into consideration **navigation and port infrastructure**. However, there are no measures specifically targeting these.

No reference has been found in the five FRMPs assessed to **dredging** as a measure to increase the river channel capacity<sup>60</sup>. It should however be noted that the RBMP for the Guadalquivir RBD (ES050)<sup>61</sup> includes a justification of the Guadalquivir estuary dredging as a WFD Art.4(7) exemption, due to its benefits for flood risk reduction, listing this aspect as an important one for justifying overriding public interest. This measure is not listed in the FRMP but only in the RBMP<sup>62</sup> (which does not further refer to the FRMP and its data).

#### 4.11 Recovery from and resilience to flooding

The role of insurance policies is discussed in all five FRMPs assessed, with regard to the recovery from flooding, preparedness/resilience to flood or other issues. According to the data reported in the reporting sheets, insurance policies are included as recovery measures, for people and goods, and in particular the agricultural sector. This applies to all UoMs by means of the National Joint Insurance Compensation Agreement (*Consortio de Compensación de Seguros*) and the National Entity for Agrarian Insurance (*Entidad Estatal de Seguro Agrarios* (ENESA)).

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<sup>59</sup> ES014 FRMP, Annex 2, page 49; ES017 FRMP, Annex 2, page 50; ES060 FRMP Annexes; ES080 FRMP Annex 2; ES110 FRMP

<sup>60</sup> FRMPs and their Annexes 2 (measures).

<sup>61</sup> RBMP ES050, Annex 8, page 49.

<sup>62</sup> Spain subsequently noted that this measure aims to facilitate navigation.

With regard to the type of insurance available or to be developed for potential flooding areas, the information is briefly explained, but refers only to agrarian, agricultural and livestock subscription modules.

With regard to the flood insurance for properties in all flood risk areas, and in particular in high flood risk areas, no information has been found on this specific detail in the five FRMPs assessed. Although “people and goods” are mentioned, there is only an explicit reference to “agricultural holdings” in terms of properties. No mention has been found to which type of risk areas the insurance would apply. No information was found whether insurance is conditional on making at risk properties (domestic, industrial) as flood resilient as possible, nor if environmental liability insurance cover the restoration costs arising from flooding of potentially polluting sites and installations.

There is no detailed information about the costs and benefits of the measures included in the FRMPs assessed or their annexes, with regard to whether ecosystem services are considered in estimating restoration costs in cases where potentially polluting sites and installations may be flooded.

#### **4.12 Monitoring progress in implementing the FRMPs**

Progress in the implementation of planned measures is tracked via monitoring indicators: this is detailed in a specific chapter in all five FRMPs assessed. For each measure, the FRMP has a space to enter a numeric baseline, for the level before implementation of the measure, and a target/expected value upon its completion (e.g. kilometres of rivers or coastline, number of protocols, number of guidance documents, of regional regulation considering floods, percentage of dams with management plans). Planned dates for the completion of each measure are specified with month and year. However, not all indicators are fully filled in, and for some the FRMPs indicate that the target “needs to be determined” (e.g. number of NWRM). There are no differences between the FRMPs assessed.

A baseline has been established against which progress will be monitored and assessed in all five FRMPs assessed. The baseline is often quantitative - for example stating how many municipal reports have already been emitted in 2015 or how many kilometres of coastline have been mapped regarding their flood risk - but it also refers to status descriptions like “regulation drafted pending approval”, “project pending approval”, “pending start” and “in drafting process, e.g. when referring to legislation or protocols”. In the FRMP for Galicia (ES014) several baselines are “to be determined”, which will hamper the assessment of progress.

### 4.13 Coordination with the Water Framework Directive

The table below shows how the development of the FRMP has been coordinated with the development of the second River Basin Management Plan of the WFD.

**Table 10** *Coordination of the development of the FRMP with the development of the second River Basin Management Plan of the WFD*

	ES014, ES017, ES060, ES110	ES080
Integration of FRMP and RBMP into a single plan		
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 Floods Directive were considered in the preparation of the RBMPs <sup>a</sup>	✓	✓
Planning of win-win and no-regret measures in the FRMPs <sup>63</sup>		
The RBMP's PoMs include win-win measures in terms of achieving the objectives of the WFD and Floods Directive, drought management and NWRMs <sup>a</sup>	✓	✓
Permitting or consenting of flood risk activities (e.g. dredging, flood defence maintenance or construction) requires prior consideration of WFD objectives and RBMPs		
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 <sup>a</sup>	✓	✓
The use of sustainable drainage systems <sup>64</sup> , 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		✓

Notes: <sup>a</sup> based on reporting under the WFD

<sup>63</sup> There is evidence of some no-regret measures (of a coordination, cooperation type) in the FRMP, but was not assessed as strong enough

<sup>64</sup> Spain informed subsequently that a basic guide for the implementation of these measures is under preparation at the national level.

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 NWRM including sustainable urban drainage systems (SuDS) (note however that few NWRMs have been included so far in the budgets).

In detail, the overlap between Flood Risk Areas and water bodies has been assessed, and in particular a summary of their status and objectives for each of the concerned water bodies. In three UoMs, out of the five whose FRMPs were assessed, a joint Strategic Environmental Assessment has been undertaken for the RBMPs and FRMPs (e.g. Eastern Cantabrian, ES017; Andalusian Mediterranean Basins, ES060; Júcar, ES080).

The authorities responsible for developing FRMP and RBMP are the same for all UoMs assessed, so this coordination shall be ensured within the authorities. Coordination with the environmental objectives in Art. 4 of the WFD is done by listing of the water bodies and their status and objectives in the FRMPs, and by considering the contribution as criteria for the prioritisation of measures.

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

The following **good practices** were identified:

- Almost all measures are specific and measurable. All five of the FRMPs assessed include a clear and explicit description of what measures are trying to achieve, where, how and by when.
- The geographic reference is either UoM, APSFR or other, more specific (e.g. list of weirs to be removed in Júcar, ES080): for measures with a specific location, the description usually is detailed, such as providing a figure in km or other specifics. This level of geographic detail can be considered as a good practice.
- Natural Water Retention Measures – e.g. for river restoration - are included in the five FRMPs assessed, though the detailed description and target indicator values are often not available.
- For the five FRMPs assessed, progress in the implementation of planned measures is tracked via monitoring indicators, including quantitative baselines and targets; however, information is not provided for all the indicators.

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

- It is not clear how measures will contribute to the objectives, nor clear by how much. The FRMPs include almost exclusively effort (output) indicators only a few impact



indicators, these usually without establishing target values for 2021; therefore, the progress in achieving the objectives will be difficult to measure. It is also not clear whether the objectives will be achieved, when all measures are completed.

- The FRMPs assessed do not describe in detail either the measures, or the cost elements which are considered for the FRMP budget.
- While NWRMs are mentioned in the summary reporting of the FRMPs, no explanation is given. There are some references to NWRMs (and one measure in Júcar, ES080 described under good practices), and the necessity of coordination between FRMPs and RBMPs is indicated as a reason for the selection of sustainable solutions. In practice, however, NWRMs have only been considered relatively very marginally in the FRMP.

## 5. Consideration of climate change

The five FRMPs assessed refer to climate change scenarios of IPCC and other bodies. These show clear trends for the overall decrease in precipitation, but unclear or different trends related to daily maxima of rainfall. Given these uncertainties, all five FRMPs assessed include a measure to develop further studies on the effects of climate change on flood risk, as current information is judged as insufficient. In general, these “improvements” or “forward steps” of knowledge are scheduled for 2021 (FRMPs for Galicia, ES014; Andalusian Mediterranean Basins, ES060; Balearic Islands, ES110), for “December 2021” (Júcar, ES080), or not specified. They also include measures to improve weather forecasting<sup>65</sup>.

However, it should be noted that the expected effects of climate change have not been clearly established in the FRMPs, due to the lack of (or contradiction among) previously existing studies. For this reason, no other measures than those for knowledge improvement have been included in the FRMPs.

There is reference to the national Climate Change Adaption Strategy in some but not all five FRMPs assessed. These FRMPs mention studies on climate change, and the Spanish Office for Climate Change as an involved authority. Specifically, the FRMPs for Galicia (ES014), Andalusian Mediterranean Basins (ES060), Júcar (ES080) and Balearic Islands (ES110) mention explicitly the National Strategy for Climate Change Adaptation, as a possible strategy to contribute to in synergy without further details<sup>66</sup>.

The timeframes for the climate change scenarios have not yet been considered. There is also no information available in the reporting sheets on reference to a shift in the occurrence of extreme events and changes in numerical recurrence times. No information was found in the reporting sheets or the FRMPs with regard to whether the main sources of flooding are expected to change under the long term climate change scenarios.

### 5.1 Specific measures planned to address climate change

With regard to measures to reduce pollution risk in flood prone zones, climate change is only mentioned explicitly in the FRMPs for measures regarding studies. This applies to all five FRMPs assessed.

Climate change is not mentioned in the description of non-structural measures, including NWRMs, in the FRMPs assessed. No reference to climate change is found in the description of measures related to land use/spatial planning in the FRMPs assessed. No reference to climate

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<sup>65</sup> FRMPs ES080 Annex 2 page 16, ES014 page 117. ES110 page 96. ES060 page 106

<sup>66</sup> FRMPs ES014 page 130, ES060 page 98 and ES080 page 237 ES110 page 75

change is found in the description of measures using economic instruments, according to the FRMPs assessed and the reporting sheets. No consideration of climate change is included in the measure descriptions of structural measures, according to the FRMPs assessed.

## **5.2 Good practices and areas for further development concerning climate change**

The following **good practices** were identified:

- All five FRMPs assessed include a measure to develop further studies on the effects of climate change on flood risk.
- Reference to the National Strategy for Climate Change Adaptation in four of the five FRMPs assessed.

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

- Due to the lack and contradictions of previously existing information and studies, no clear likely impact of climate change has been identified. In consequence, no further consideration of climate change impacts was included in the FRMPs and the establishment of measures.
- Coordination between FRMPs and the national climate change adaptation strategy is not systematic.

## 6. Cost-benefit analysis

The five FRMPs assessed refer to cost benefit as a criterion for the establishment of priorities for the selection of measures. However, they do not report further details nor provide evidence of such assessments, neither in general nor specifically for the measures.

It is unclear from the FRMPs assessed for which types of measures cost-benefit analysis has been used, and no information was found in the reporting sheets or the FMRPs assessed indicating whether the method used multi-benefits.

The FRMP for Eastern Cantabrian, ES017, reports that no transboundary measures are planned and thus no cost-benefit assessment of measures with transnational effects has been undertaken, according to the reporting sheets.

### 6.1 Good practices and areas for further development

The following **good practice** was identified:

- Cost benefit analysis is reported to be used as a criterion for the prioritisation of measures.

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

- The cost-benefit assessment for measures is not documented in the FRMPs, and such assessments are expected to be applied only for structural measures and during the implementation phase of FRMPs.<sup>67</sup>

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<sup>67</sup> Spain subsequently noted that it was considered unfeasible to carry out a cost-benefit assessment of all the measures; this will only be carried out for the structural measures during the implementation phase of the FRMPs (which has already been completed in the case of the Eastern Cantabrian FRMP, ES017). The first step is to create a guide with the relevant methodology and the second will consist of the cost-benefit assessment study and the prioritization of any interventions.

## 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 Floods Directive have not changed recently. No new documents on the matter have been submitted to the European Commission since 2010.

### 7.2 Public information and consultation

The table below shows how the public and interested parties were **informed** in the five UoMs 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 11** *Methods used to inform the public and interested parties of the FRMP*

	ES014	ES017	ES060	ES080	ES110
Media (papers, TV, radio)					
Internet	✓	✓	✓	✓	✓
Digital social networking					
Printed material				✓	
Direct mailing <sup>68</sup>					
Invitations to stakeholders	✓	✓			
Local Authorities					
Meetings	✓	✓			

*Source: FRMP*

For all five RBMPs assessed, information was provided via the Internet:

- The Eastern Cantabrian, ES017 FRMP states that the website was used, and two workshops were held during the consultation, and includes a list of the stakeholders that were invited to attend the meetings.
- The Júcar, ES080 FRMP reports on information days, workshops and expert meetings as well as factsheets in the preparatory steps of FD implementation; however, it is not clear if this activity refers to the consultation of the FRMP.
- Balearic Islands, ES110 FRMP does not provide details on the consultation process<sup>69</sup>.

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

<sup>68</sup> Spain subsequently informed that in order to boost the Public Consultation of and the Active Participation in the ES014 FRMP, work was carried out with all those included in the Galician water authorities' Register of interested parties.

<sup>69</sup> ES017 FRMP Annex 4 Chapter 3.2 ES060 FRMP Annex 3 page 2 ES080 FRMP Annex 3 and reporting sheets ES110 FRMP Annex 3

**Table 12** *Methods used for the actual consultation*

	ES014	ES017	ES060	ES080	ES110
Via Internet		✓	✓	✓	✓
Via digital social networking					
Direct invitation					
Exhibitions					
Workshops, seminars or conferences					
Telephone surveys					
Direct involvement in drafting FRMP	✓	✓	✓	✓	✓
Postal written comments	✓	✓	✓	✓	✓

*Source: FRMP*

For all five FRMPs assessed, consultation was reported as being carried out via written text to the competent authority<sup>70</sup>. For four of the five FRMPs consultation was carried out via Internet as well<sup>71</sup>:

- The FRMP for Galicia (ES014) states that in the implementation phase of the plan, information days, workshops and expert meetings as well as factsheets will be organised to stimulate the FRMP implementation; and four information meetings were held in November 2017 (after the adoption of the Plans). There are no such reported activities for the consultation phase of the draft FRMP.
- The Eastern Cantabrian (ES017) FRMP informs that website was used, and two workshops being held during the consultation, and includes a list of the stakeholders that were invited to attend the meetings.
- The Andalusian Mediterranean Basins (ES060) FRMP reports that there was a written consultation and submission of comments by email.
- The Júcar (ES080) FRMP reports that consultation was made in written form.
- The Balearic Islands (ES110) FRMP does not provide details on the consultation process.

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

**Table 13** *Methods used to provide the documents for the consultation*

	All UoMs assessed
Downloadable	✓
Direct mailing (e-mail)	
Direct mailing (post)	

<sup>70</sup> Spain subsequently informed that several national bodies bringing together stakeholders provided written reports on all the FRMPs. These included: the National Water Council, with representatives from all industries and interest groups related to water; and the National Council for Civil Protection, with representatives from Civil Protection authorities in all the Autonomous Communities and the Military Unit for Emergencies.

<sup>71</sup> Spain subsequently informed that this was the case also for the fifth FRMP, Galicia (ES014).

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: FRMP

For all five FRMPs assessed, the documents were provided at the main office of the competent authority, in physical form (printed), and via internet (website of the competent authority), according to the FRMPs.

### 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 14** *Groups of stakeholders actively involved in the development of the five FRMPs assessed*

	All UoMs assessed
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) <sup>72</sup>	
Consumer Groups	
Local / Regional authorities	✓
Academia / Research Institutions	✓
Meteorological Institute	✓
Climate Change Office	✓
Geological Institute	✓
Agrarian Insurance Body	✓

<sup>72</sup> Spain subsequently informed that NGOs and the groups of stakeholders in the table are represented in the National Water Council and in the National Civil Protection Council, both organisms were consulted in the process of preparing the FRMPs

Source: FRMP

In general, during the drafting process of FRMPs, technical working groups were established for coordination with the institutions listed in the table above. It should be noted that this description is a standard text, which, for example, was also adopted by Balearic Islands, ES110, led by a regional UoM authority.

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

**Table 15** *Mechanisms used to ensure the active involvement of stakeholders*

	ES014	ES017	ES060	ES080	ES110
Regular exhibitions					
Establishment of advisory groups					
Involvement in drafting					
Workshops and technical meetings		✓		✓	
Formation of alliances					
Information days		✓			

Source: FRMP

Specific mechanisms for the active involvement of stakeholders have been reported for the Eastern Cantabrian (ES017) and Júcar (ES080) FRMPs, namely workshops, technical meetings, and information days.

## 7.4 Effects of consultation

The FRMPs assessed include extensive information in the Annexes describing in detail the text of comments received and the response texts of the administrations. However, the information is very detailed, and aggregation is not practical.

## 7.5 Strategic Environmental Assessment

All five FRMPs assessed have undergone an SEA procedure. In some cases, a joint Strategic Environmental Assessment was undertaken for the RBMPs and FRMPs (Eastern Cantabrian, ES017; Andalusian Mediterranean Basins, ES060; and Júcar, ES080)<sup>73</sup>.

## 7.6 Good practices and areas for further development regarding Governance

The following **good practice** was identified:

<sup>73</sup> FRMPs Chapter on SEA evaluation.



- SEAs have been carried out for all the FRMPs. In some cases, a joint Strategic Environmental Assessment has been undertaken for the RBMPs and FRMPs (Eastern Cantabrian, ES017; Andalusian Mediterranean Basins, ES060; Júcar, ES080).
- The FRMPs include extensive information in the Annexes describing in detail the texts of comments received during consultation and the responses of the administrations.

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

- The number of comments received during the consultation has been low in general. The reasons should be investigated to potentially adjust the approach for the second cycle.

## Annex A: Supplementary tables and charts on measures

This Annex gives an overview of the data on measures provided by Spain 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 Plans (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 Floods Directive)<sup>74</sup>, 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.

---

<sup>74</sup> <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 on the name of the Responsible Authority, above), are categorised as “no information”.

## Types of measures used in reporting

The following table<sup>75</sup> 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’.

### *Types of measures used in reporting*

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

<sup>75</sup> Guidance for Reporting under the Floods Directive (2007/60/EC):  
<https://circabc.europa.eu/w/browse/a3c92123-1013-47ff-b832-16e1caaafc9a/>

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## Measures overview

**Table A1** *Number of measures reported in the reporting sheets*

Number of individual measures	192
Number of individual measures including measures which have been allocated to more than one measure type	192
Number of aggregated measures	1 171
Number of aggregated measures including measures which have been allocated to more than one measure type	1 171
Total number of measures	1 363
Total number of measures including measures which have been allocated to more than one measure type	1 363
Range of number of measures between UoMs including measures which have been allocated to more than one measure type	49 - 156
Average number of measures across UoMs including measures which have been allocated to more than one measure type	80

**Table A2** *Number of individual measures per measure type and UoM, including duplicates*

	Prevention		Protection				Preparedness			Recovery & review		Other	Grand Total
	M21	M24	M31	M32	M33	M34	M41	M42	M43	M51	M53		
ES010			6										6
ES014			4										4
ES017			2		22			1					25
ES018			1		19			2					22
ES020			4				1						5
ES030			5										5
ES040			27		1								28
ES050			8										8
ES060					12								12
ES063					2								2
ES064			2		1								3
ES070			20	1	7	4							32

	Prevention		Protection				Preparedness			Recovery & review		Other	Grand Total
	M21	M24	M31	M32	M33	M34	M41	M42	M43	M51	M53		
ES080	1		6	4						1			12
ES091		1	8	1	3	1		5	2	1	1		23
ES110			5										5
<b>Grand Total</b>	<b>1</b>	<b>1</b>	<b>98</b>	<b>6</b>	<b>67</b>	<b>5</b>	<b>1</b>	<b>8</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>192</b>
<b>Average per UoM</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>7</b>	<b>&lt;1</b>	<b>4</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>0</b>	<b>13</b>

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

	Prevention				Protection			Preparedness			Recovery & review			Other	Grand Total
	M21	M22	M23	M24	M31	M32	M33	M34	M41	M42	M43	M51	M53		
ES010	4		1	7	3	4	2	1	9	6	3	2	11		53
ES014	5		1	12	6	3	3	2	7	5	3	4	11		62
ES017	9	1	1	14	7	3	6	2	18	6	3	9	11		90
ES018	9	1	1	14	8	3	6	2	14	14	10	9	11		102
ES020	5	1	1	9	3	5	2	1	8	6	3	2	11		57
ES030	4		1	8	7	5	2	1	12	6	3	2	11		62
ES040	5	1	1	12	11	4	2	2	9	6	3	3	11		70
ES050	5	1	1	11	4	7	2	1	8	6	3	3	11		63
ES060	7			10	3	6	3	1	6	6	3	7	13		65
ES063	7			10	3	6	7	1	6	6	3	7	13		69
ES064	6			9	2	6	2	1	6	6	1	4	13		56
ES070	7		2	10	2	9	1	1	8	9	3	3	11		66
ES080	6	1	1	12	6	3	3	1	9	8	5	3	11		69
ES091	23		1	17	8	7	2	1	24	24	4	7	15		133
ES110	4		1	9	4	1	2	1	7	7	3	3	11		53
ES150	5	1	1	11	2	4	2	1	3	5	3	3	11		52
ES160	5	1	1	11	2	1	2	1	3	5	3	3	11		49

	Prevention				Protection			Preparedness			Recovery & review			Other	Grand Total
	M21	M22	M23	M24	M31	M32	M33	M34	M41	M42	M43	M51	M53		
<b>Grand Total</b>	<b>116</b>	<b>8</b>	<b>15</b>	<b>186</b>	<b>81</b>	<b>77</b>	<b>49</b>	<b>21</b>	<b>157</b>	<b>131</b>	<b>59</b>	<b>74</b>	<b>197</b>	<b>0</b>	<b>1 171</b>
<b>Average per UoM</b>	<b>7</b>	<b>&lt;1</b>	<b>1</b>	<b>11</b>	<b>5</b>	<b>5</b>	<b>3</b>	<b>1</b>	<b>9</b>	<b>8</b>	<b>3</b>	<b>4</b>	<b>12</b>	<b>0</b>	<b>69</b>

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

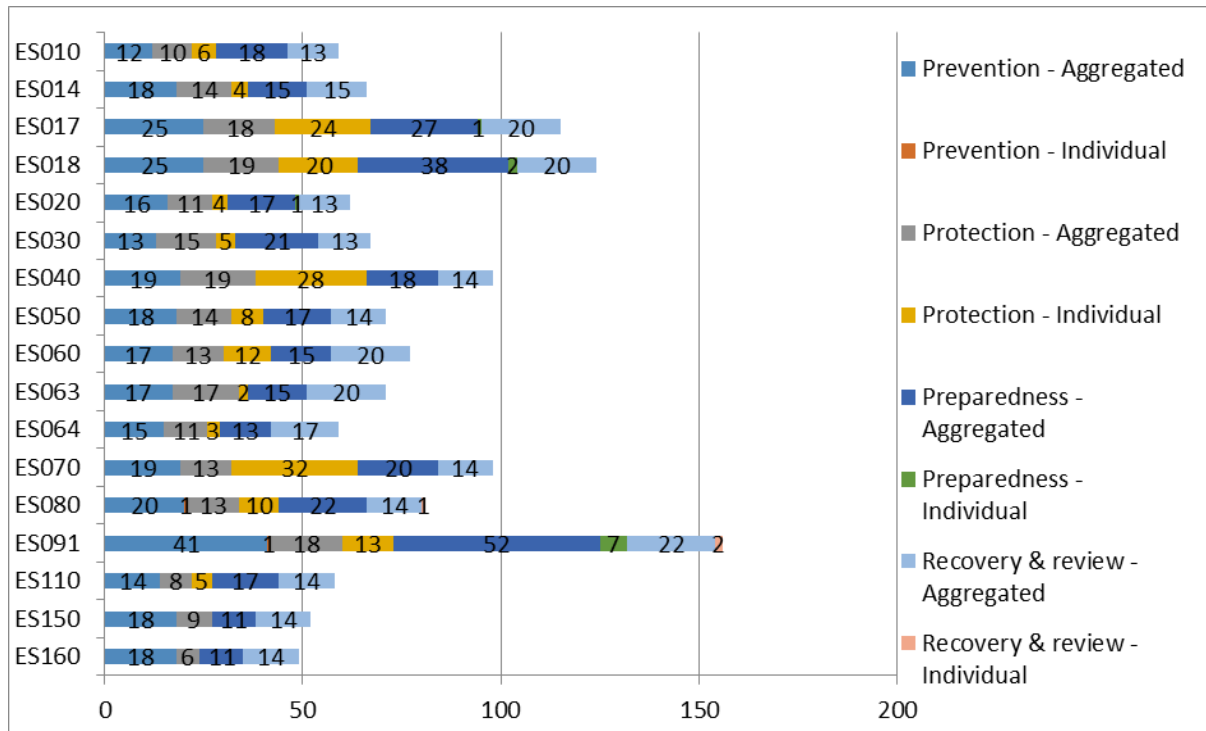
	Prevention		Total	Protection		Total	Preparedness		Total	Recovery & review		Total	Other	Grand Total
	Aggregate	Individual		Aggregate	Individual		Aggregate	Individual		Aggregate	Individual			
ES010	12		12	10	6	16	18		18	13		13		59
ES014	18		18	14	4	18	15		15	15		15		66
ES017	25		25	18	24	42	27	1	28	20		20		115
ES018	25		25	19	20	39	38	2	40	20		20		124
ES020	16		16	11	4	15	17	1	18	13		13		62
ES030	13		13	15	5	20	21		21	13		13		67
ES040	19		19	19	28	47	18		18	14		14		98
ES050	18		18	14	8	22	17		17	14		14		71
ES060	17		17	13	12	25	15		15	20		20		77
ES063	17		17	17	2	19	15		15	20		20		71
ES064	15		15	11	3	14	13		13	17		17		59
ES070	19		19	13	32	45	20		20	14		14		98
ES080	20	1	21	13	10	23	22		22	14	1	15		81
ES091	41	1	42	18	13	31	52	7	59	22	2	24		156
ES110	14		14	8	5	13	17		17	14		14		58
ES150	18		18	9		9	11		11	14		14		52
ES160	18		18	6		6	11		11	14		14		49
<b>Grand Total</b>	<b>325</b>	<b>2</b>	<b>327</b>	<b>228</b>	<b>176</b>	<b>404</b>	<b>347</b>	<b>11</b>	<b>358</b>	<b>271</b>	<b>3</b>	<b>274</b>	<b>0</b>	<b>1 363</b>

	Prevention		Total	Protection		Total	Preparedness		Total	Recovery & review		Total	Other	Grand Total
	Aggregate	Individual		Aggregate	Individual		Aggregate	Individual		Aggregate	Individual			
Average per UoM	19	<1	19	13	10	24	20	1	21	16	<1	16	0	80

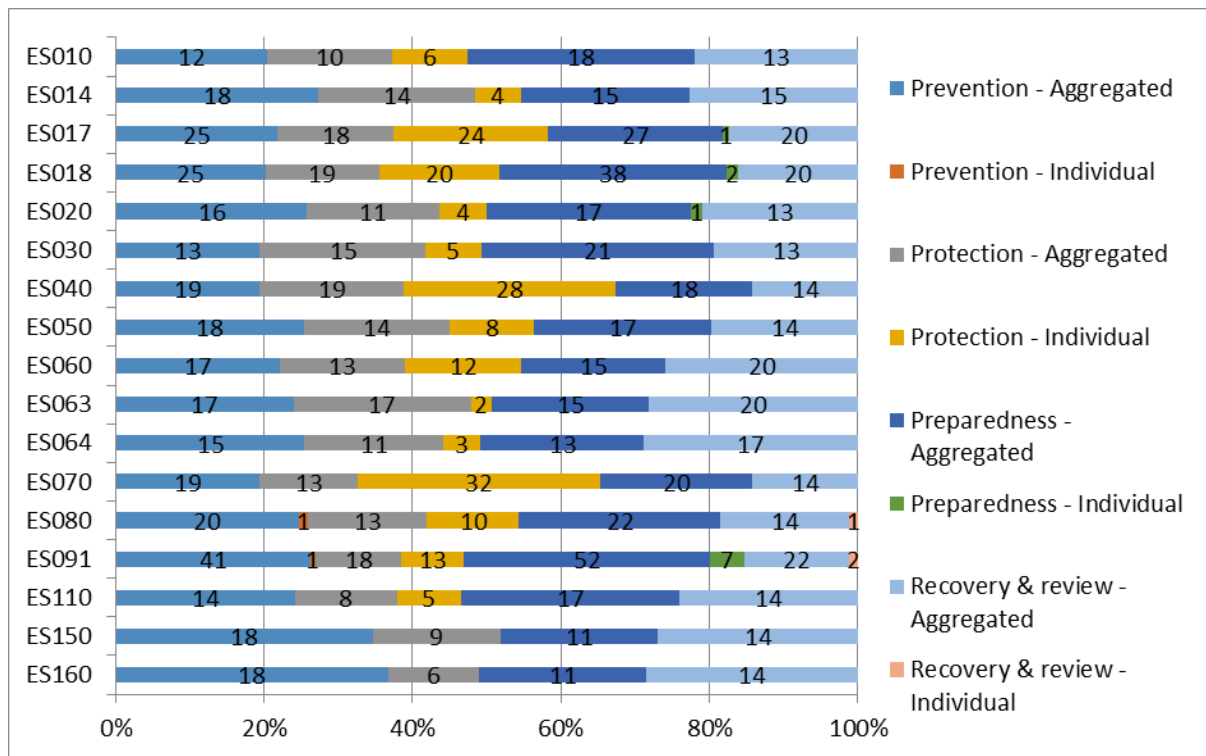


The information in Tables A3, A4 and A5 is visualised in Figures A1 and A2 below:

**Figure A1** Number of total measures (individual and aggregate) by measure aspect



**Figure A2** Share of total measures (aggregated and individual) by measure aspect



## Measure details: cost

Member States were requested to report information on:

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

The reported information on costs in the reporting sheets is descriptive. For Spain, it was not possible to aggregate the information provided in tabular form.

## 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).

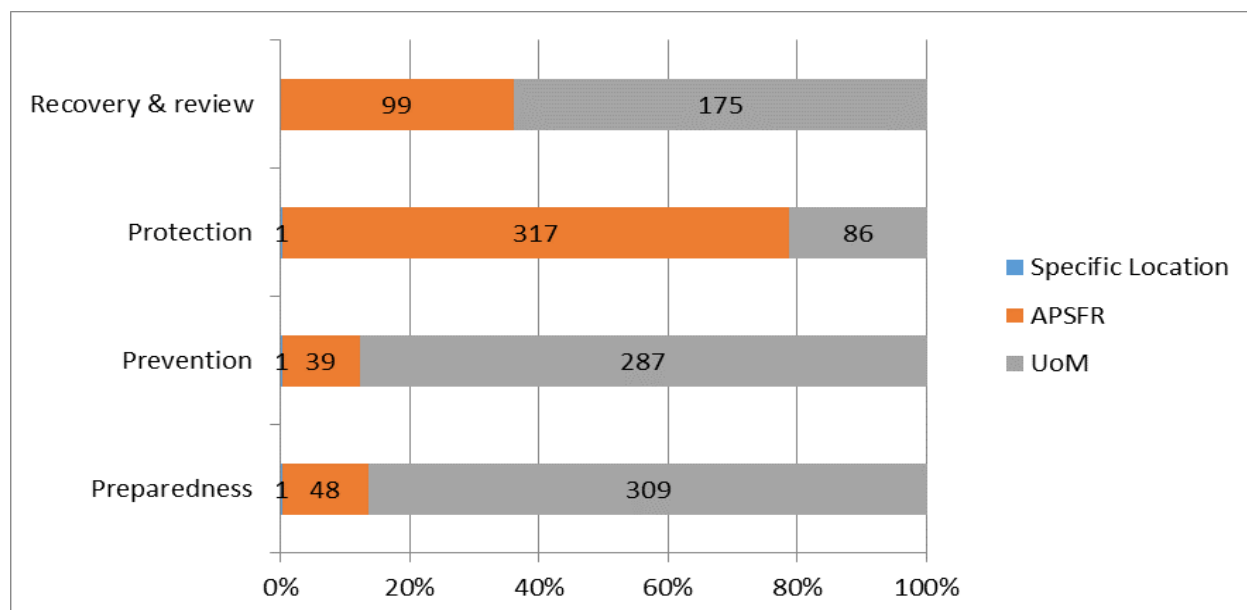
## Location of measures

For Spain, it has been possible to identify the location of all measures, as the free format answers are fairly uniform.

**Table A5** *Location of implementation by measure aspect*

	<b>Specific Location</b>	<b>APSFR</b>	<b>UoM</b>	<b>Grand Total</b>
Preparedness	1	48	309	358
Prevention	1	39	287	327
Protection	1	317	86	404
Recovery & review		99	175	274
<b>Grand Total</b>	<b>3</b>	<b>503</b>	<b>857</b>	<b>1 363</b>

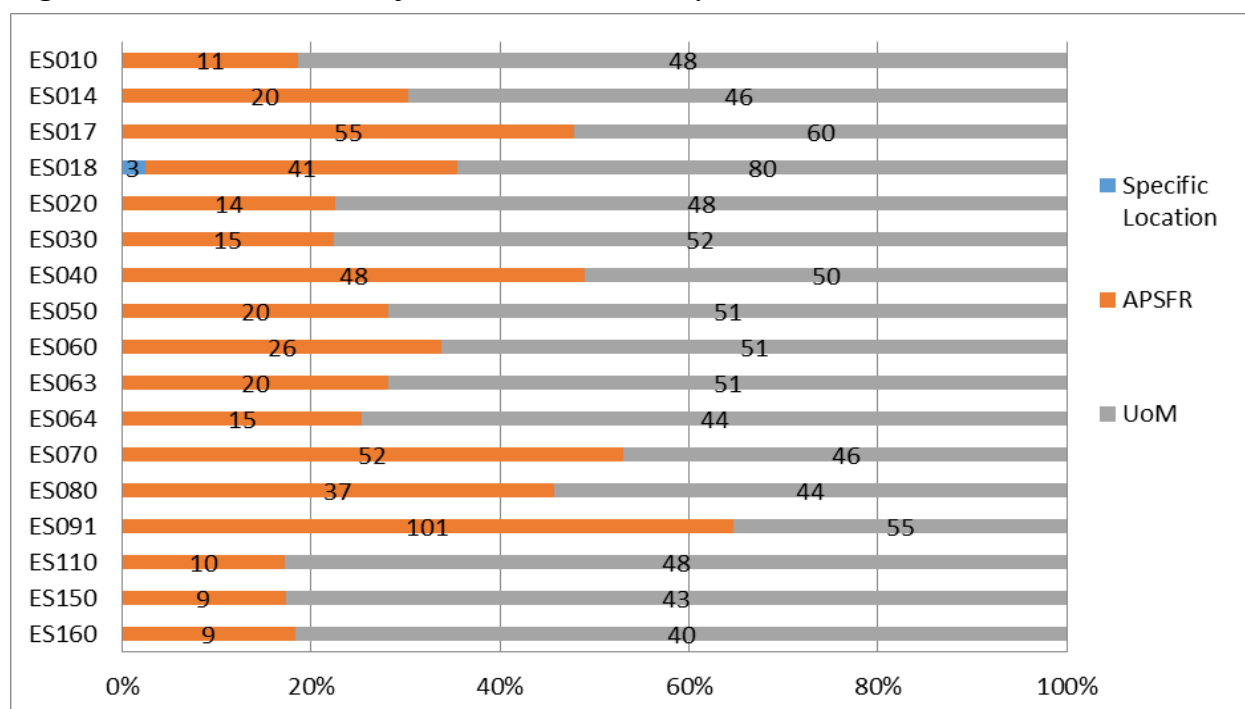
**Figure A3** Visualisation of Table A6: Location by measure aspect



**Table A6** Location of implementation by UoM

	Specific Location	APSFR	UoM	Grand Total
ES010		11	48	59
ES014		20	46	66
ES017		55	60	115
ES018	3	41	80	124
ES020		14	48	62
ES030		15	52	67
ES040		48	50	98
ES050		20	51	71
ES060		26	51	77
ES063		20	51	71
ES064		15	44	59
ES070		52	46	98
ES080		37	44	81
ES091		101	55	156
ES110		10	48	58
ES150		9	43	52
ES160		9	40	49
<b>Grand Total</b>	<b>3</b>	<b>503</b>	<b>857</b>	<b>1 363</b>
<b>Average per UoM</b>	<b>&lt;1</b>	<b>30</b>	<b>50</b>	<b>80</b>

**Figure A4** Visualisation of Table A7: Location by UoM



## Geographic coverage

No information reported in the reporting sheets.

## 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).

In the reporting for Spain, covering all reported UoMs, 218 different answers are given across the measures, which makes the aggregation of the information in tables and charts impractical.

## Category of priority

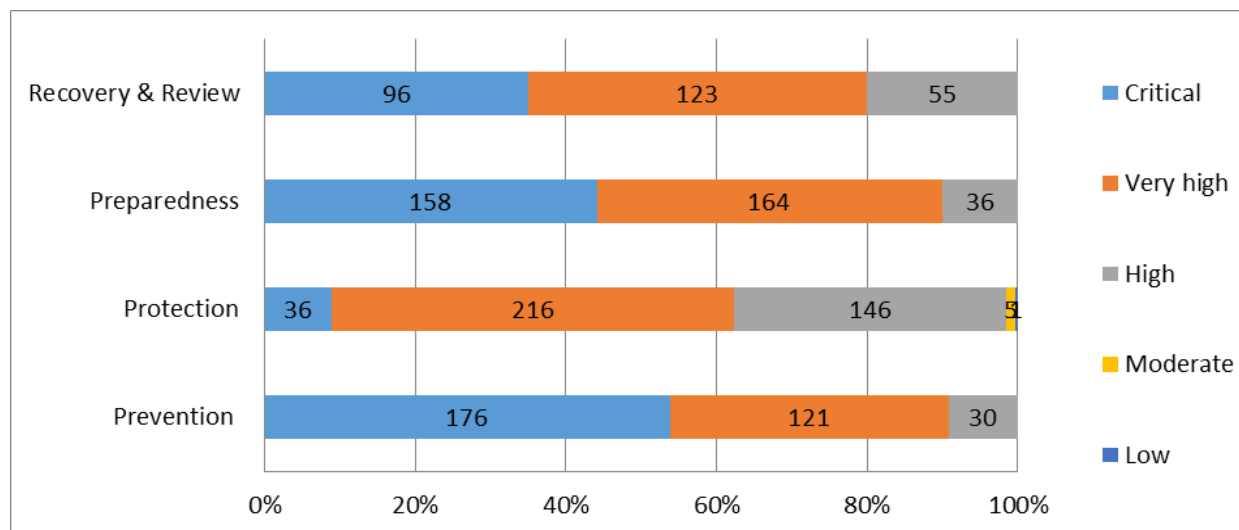
Spain provided information for the priority of all measures. The following categories are used in reporting:

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

**Table A7** *Category of priority by measure aspect*

	Critical	Very high	High	Moderate	Low	Grand Total
Prevention	176	121	30			327
Protection	36	216	146	5	1	404
Preparedness	158	164	36			358
Recovery & Review	96	123	55			274
<b>Grand Total</b>	<b>466</b>	<b>624</b>	<b>267</b>	<b>5</b>	<b>1</b>	<b>1 363</b>

**Figure A5** *Visualisation of Table A8: Category of priority by measure aspect*

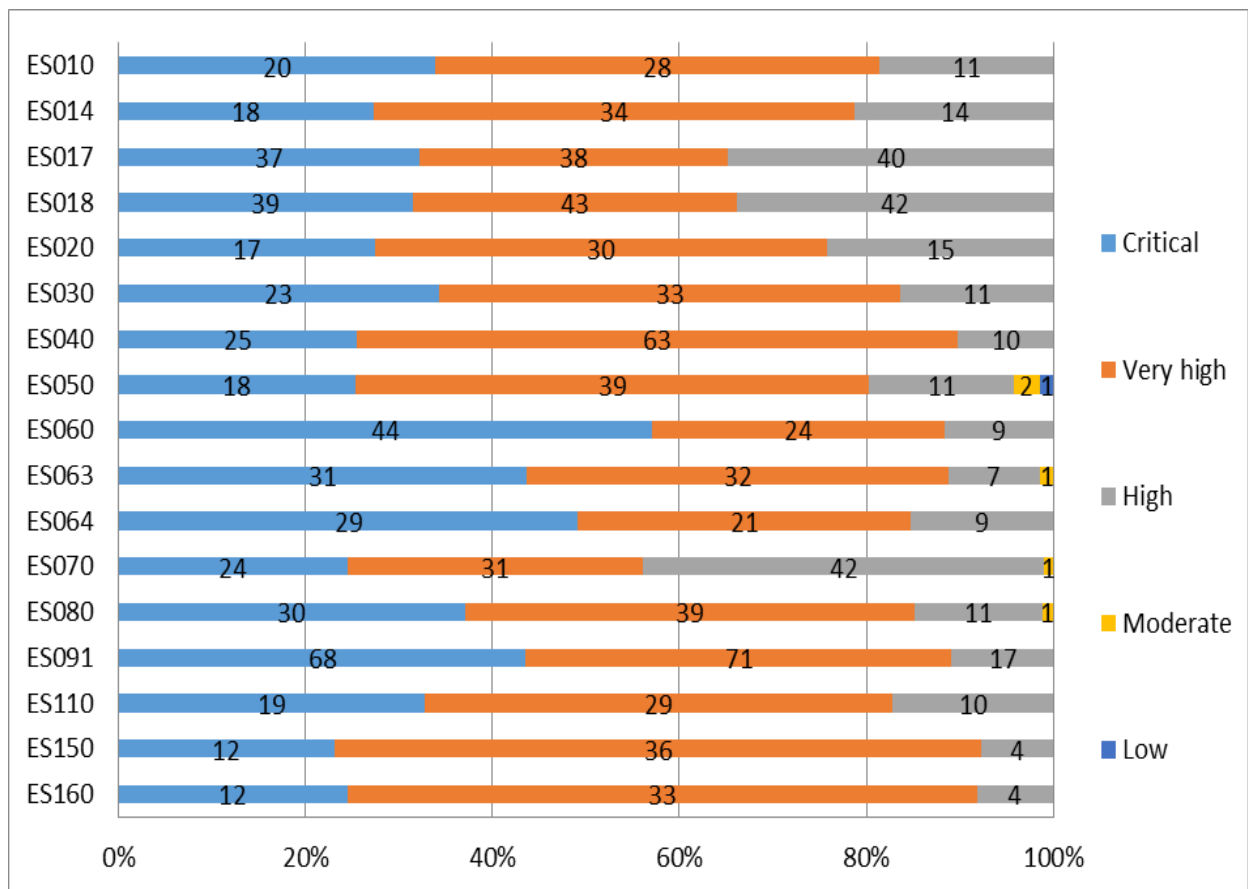


**Table A8** *Category of priority by UoM*

	Critical	Very high	High	Moderate	Low	Grand Total
ES010	20	28	11			59
ES014	18	34	14			66
ES017	37	38	40			115
ES018	39	43	42			124
ES020	17	30	15			62

	Critical	Very high	High	Moderate	Low	Grand Total
ES030	23	33	11			67
ES040	25	63	10			98
ES050	18	39	11	2	1	71
ES060	44	24	9			77
ES063	31	32	7	1		71
ES064	29	21	9			59
ES070	24	31	42	1		98
ES080	30	39	11	1		81
ES091	68	71	17			156
ES110	19	29	10			58
ES150	12	36	4			52
ES160	12	33	4			49
<b>Grand Total</b>	<b>466</b>	<b>624</b>	<b>267</b>	<b>5</b>	<b>1</b>	<b>1 363</b>
<b>Average per UoM</b>	<b>27</b>	<b>37</b>	<b>16</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>80</b>

Figure A6 Visualisation of Table A9: Category of priority by UoM



## Timetable

For Spain, there does not seem to be a clear relationship between the timetable and the priorities. 653 different answers are provided on the timetable and the aggregation of the data was thus not possible.

## Measure details: authorities

Member States were requested to report information on:

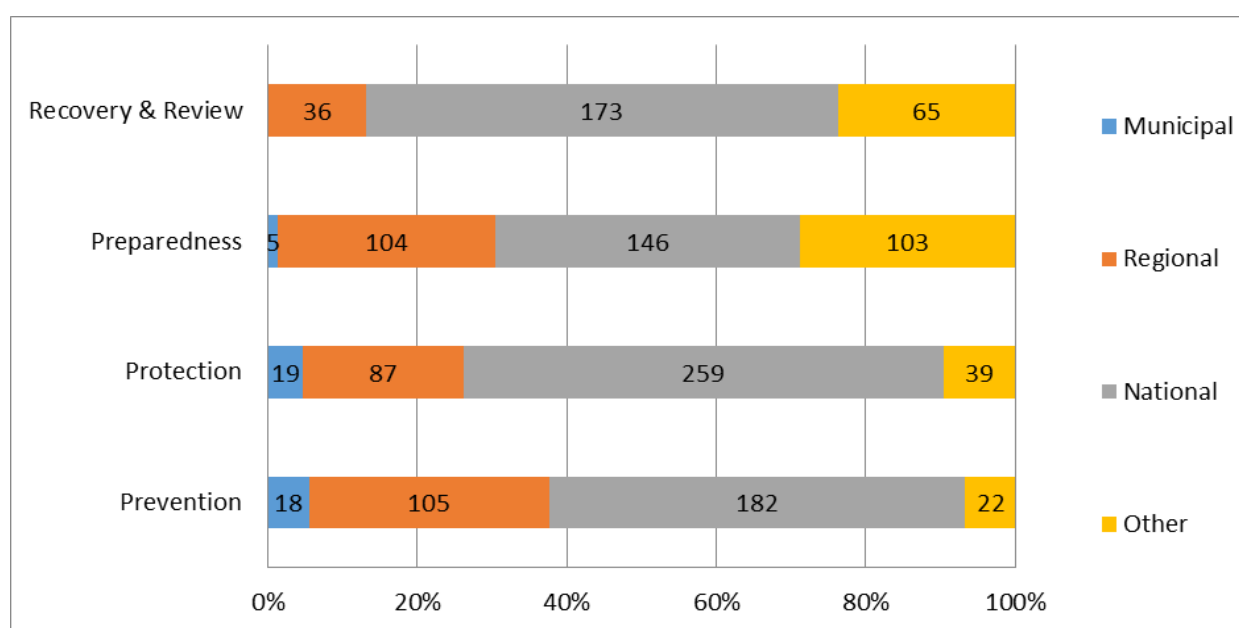
- Name of the responsible authority (optional if ‘level of responsibility’ is reported);
- Level of responsibility (optional if ‘name of the responsible authority’ is reported).

Spain reported on both fields. The tables and charts below are developed based on the level of responsibility.

**Table A9** *Level of responsibility by measure aspect*

	Municipal	Regional	National	Other	Grand Total
Prevention	18	105	182	22	327
Protection	19	87	259	39	404
Preparedness	5	104	146	103	358
Recovery & Review		36	173	65	274
<b>Grand Total</b>	<b>42</b>	<b>332</b>	<b>760</b>	<b>229</b>	<b>1 363</b>

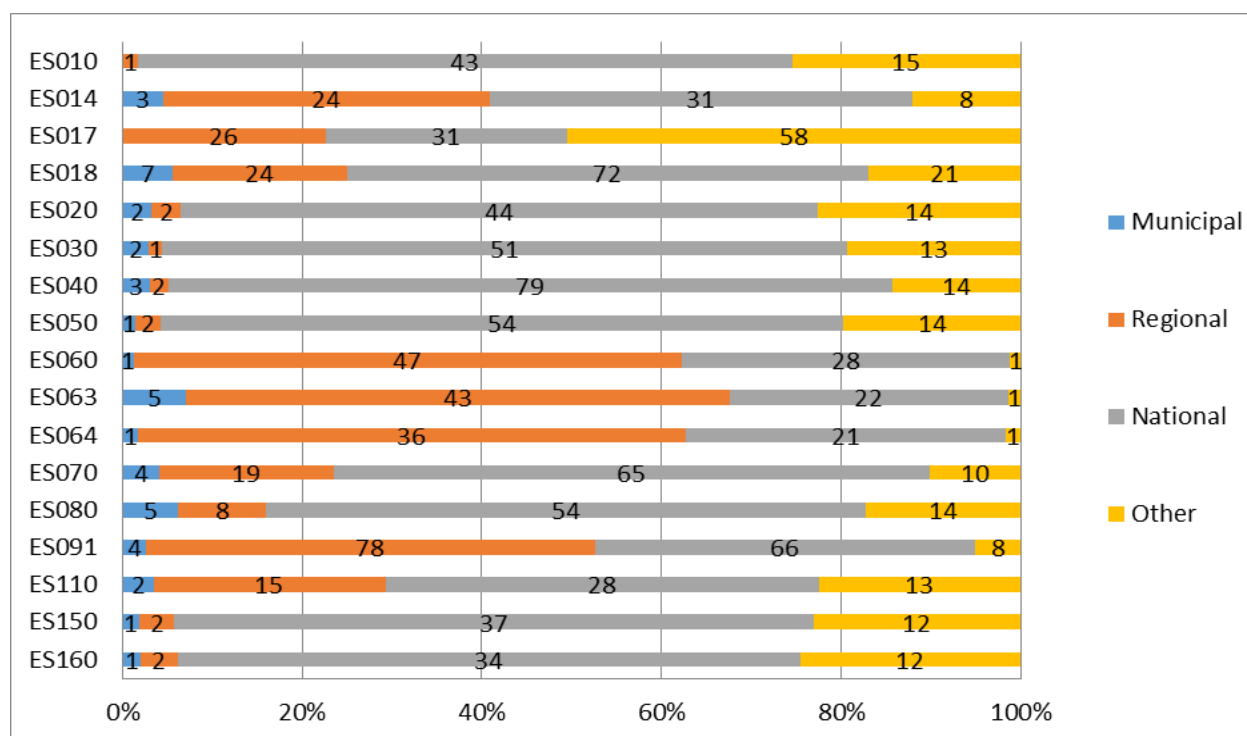
**Figure A7** *Visualisation of Table A10: Level of responsibility by measure aspect*



**Table A10** Level of responsibility by UoM

	Municipal	Regional	National	Other	Grand Total
ES010		1	43	15	59
ES014	3	24	31	8	66
ES017		26	31	58	115
ES018	7	24	72	21	124
ES020	2	2	44	14	62
ES030	2	1	51	13	67
ES040	3	2	79	14	98
ES050	1	2	54	14	71
ES060	1	47	28	1	77
ES063	5	43	22	1	71
ES064	1	36	21	1	59
ES070	4	19	65	10	98
ES080	5	8	54	14	81
ES091	4	78	66	8	156
ES110	2	15	28	13	58
ES150	1	2	37	12	52
ES160	1	2	34	12	49
<b>Grand Total</b>	<b>42</b>	<b>332</b>	<b>760</b>	<b>229</b>	<b>1 363</b>
<b>Average per UoM</b>	<b>2</b>	<b>20</b>	<b>45</b>	<b>13</b>	<b>80</b>

**Figure A8** Visualisation of Table A11: Level of responsibility by UoM





## 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.

Spain reported information about the progress of implementation of the measures. The progress of implementation was reported as<sup>76</sup>:

- 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.

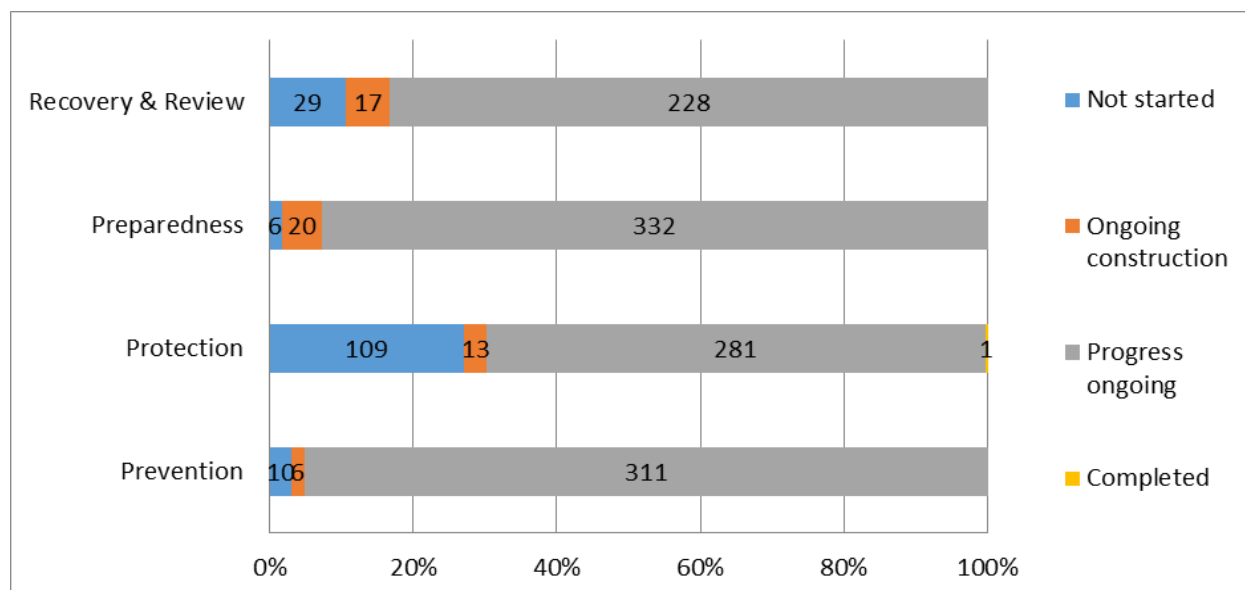
**Table A11** *Progress of implementation by measure aspect*

	<b>Not started</b>	<b>Ongoing construction</b>	<b>Progress ongoing</b>	<b>Completed</b>	<b>Grand Total</b>
Prevention	10	6	311		327
Protection	109	13	281	1	404
Preparedness	6	20	332		358
Recovery & Review	29	17	228		274
<b>Grand Total</b>	<b>154</b>	<b>56</b>	<b>1 152</b>	<b>1</b>	<b>1 363</b>

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<sup>76</sup> Guidance for Reporting under the Floods Directive (2007/60/EC):  
<https://circabc.europa.eu/w/browse/a3c92123-1013-47ff-b832-16e1caaafc9a>

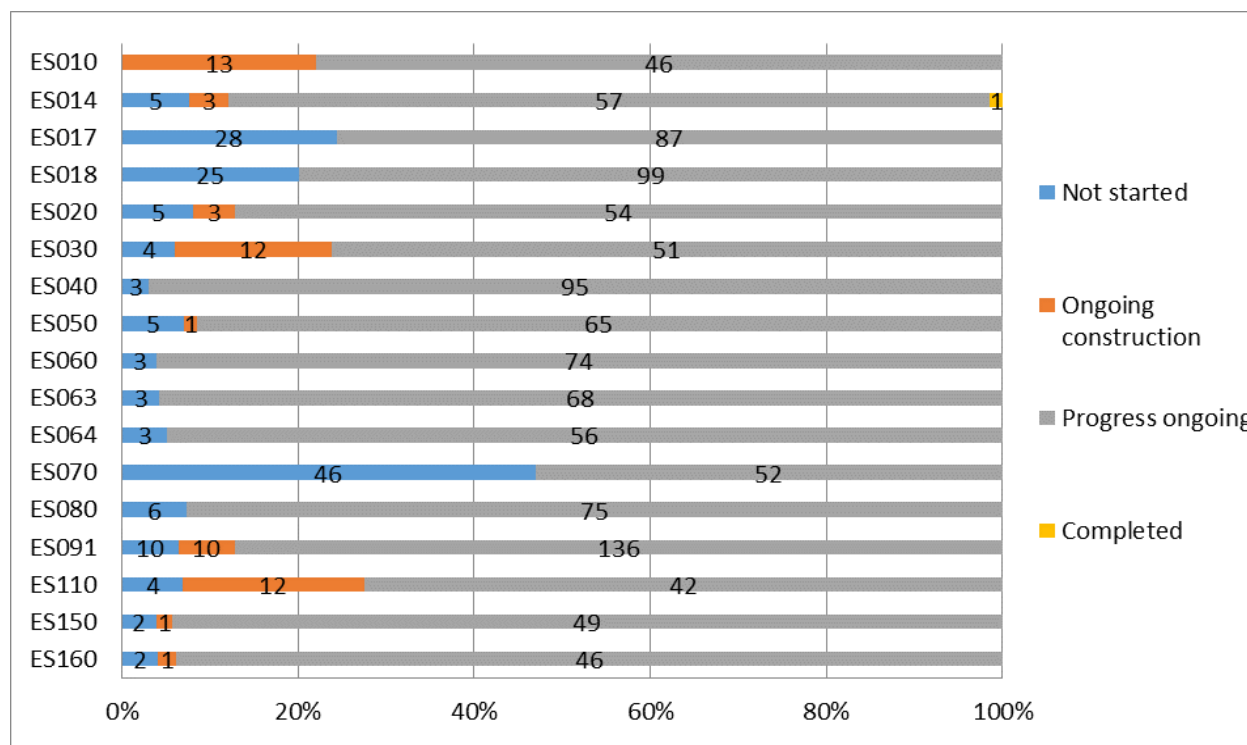
**Figure A9** Visualisation of Table A12: Progress of implementation by measure aspect



**Table A12** Progress of implementation by UoM

	Not started	Ongoing construction	Progress ongoing	Completed	Grand Total
ES010		13	46		59
ES014	5	3	57	1	66
ES017	28		87		115
ES018	25		99		124
ES020	5	3	54		62
ES030	4	12	51		67
ES040	3		95		98
ES050	5	1	65		71
ES060	3		74		77
ES063	3		68		71
ES064	3		56		59
ES070	46		52		98
ES080	6		75		81
ES091	10	10	136		156
ES110	4	12	42		58
ES150	2	1	49		52
ES160	2	1	46		49
<b>Grand Total</b>	<b>154</b>	<b>56</b>	<b>1 152</b>	<b>1</b>	<b>1 363</b>
<b>Average per UoM</b>	<b>9</b>	<b>3</b>	<b>68</b>	<b>&lt;1</b>	<b>80</b>

**Figure A10** Visualisation of Table A13: Progress of implementation by UoM



The categories describing the progress of measures are defined in the EU Reporting Guidance Document on the Floods Directive:

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 report information on:

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

For Spain, 159 different items are reported under other Community Acts. Consequently, it was not possible to aggregate the information into a table.

## Annex B: Definitions of measure types

**Table B1** *Types of flood risk management measures*<sup>77</sup>

<b>No Action</b>	
M11	No Action, No measure is proposed to reduce the flood risk in the APSFR or other defined area,
<b>Prevention</b>	
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...)
<b>Protection</b>	
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 through 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
<b>Preparedness</b>	
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
<b>Recovery &amp; Review</b>	

<sup>77</sup> Guidance for Reporting under the Floods Directive (2007/60/EC):  
<https://circabc.europa.eu/w/browse/a3c92123-1013-47ff-b832-16e1caaafc9a/>

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
<b>Other</b>	
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, and other measures, or similar measures called by a different name, that 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*

<b>Agriculture</b>	<b>Forest</b>	<b>Hydro Morphology</b>	<b>Urban</b>
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
A07 Low till agriculture	F07 'Water sensitive' driving	N07 Reconnection of oxbow lakes and similar	U07 Soakaways

<b>Agriculture</b>	<b>Forest</b>	<b>Hydro Morphology</b>	<b>Urban</b>
		features	
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](http://www.nwrm.eu)