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COMMISSION STAFF WORKING DOCUMENT

First Flood Risk Management Plans - Member State: Greece

Table of Contents

Acronyms

APSFR	Areas of Potential Significant Flood Risk
CBA	Cost Benefit Analysis
CEA	Cost-effectiveness Analysis
C_n	Runoff curve number
EEA	European Environment Agency
EL	Greece
FD	Floods Directive
FHRM	Flood Hazard and Risk Map
FRMP	Flood Risk Management Plan
IDF	Intensity-duration-frequency (for measuring rainfall)
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, or APSFRs). By the end of 2013, they were to draw up Flood Hazard and Risk Maps (FHRMs) for such areas. On the basis of these maps, Member States were then to prepare Flood Risk Management Plans (FRMPs) by the end of 2015.

This report assesses the FRMPs for Greece (EL)[1]. 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[2] under Articles 7 and 15 of the FD This reporting provides an overview of the plans and details on the related measures.
- Selected FRMPs: due to the high number of FRMPs prepared in Greece (15[3]), the assessment focused on a selected set of plans chosen to cover a broad range of different characteristics (including different flood types identified and different physical and socioeconomic situations). The selection includes both transboundary and national Units of Management (UoMs). The FRMPs for the following UoMs were assessed:
  - EL01, Western Peloponnese (affected by fluvial and coastal flood sources)
  - EL05, Epirus (a transboundary UoM, shared with Albania; fluvial and coastal flood sources)
  - EL06, Attica (site of the Athens-Piraeus urban area, the largest in Greece; fluvial flood sources)
  - EL12, Thrace (a transboundary UoM, shared with Bulgaria and Turkey; fluvial flood sources)
  - EL14, Aegean Islands (numerous islands; both fluvial and coastal flood sources)

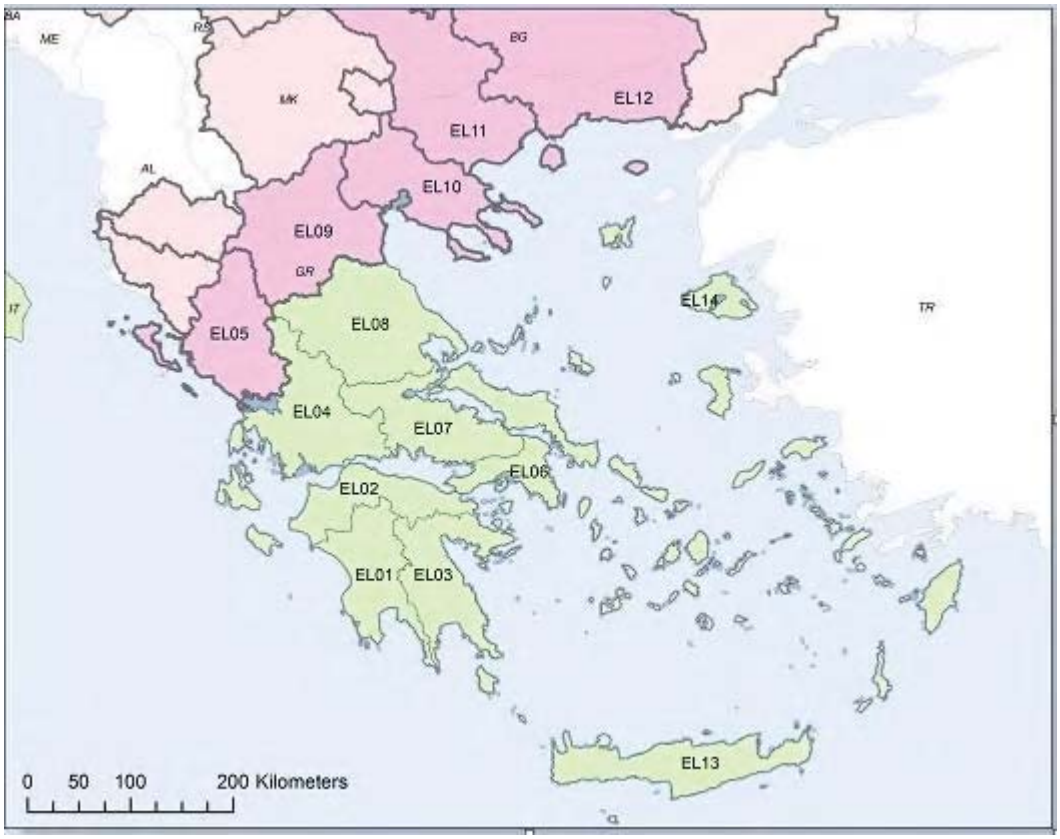
[1] The present Member State assessment report reflects the situation as reported by Greece to the European Commission in 2018 and with reference to FRMPs prepared earlier. The situation in the Member State may have changed since then.

[2] Referred to as 'Reporting Sheets' throughout this report. The format for reporting was drawn up jointly by the Member States and the European Commission as part of a collaborative process called the 'Common Implementation Strategy'.

[3] One for each of the 14 UoMs plus one for the Evros sub-basin.

Overview

Figure 1 Map of Units of Management/River Basin Districts



International River Basin Districts (within the European Union)
International River Basin Districts (outside the European Union)
National River Basin Districts (within the European Union)
Countries (outside European Union)
Coastal waters

Source: WISE, Eurostat (country borders)

Greece has reported 14 UoMs, which correspond to the River Basin Districts under the Water Framework Directive (WFD).

The approach taken to prepare the FRMPs is similar in each UoM and follows a common national approach. The FRMPs were prepared by the Special Secretariat for Water in the Ministry of Environment, following a request from the regional-level Water Directorates, according to the Reporting Sheets.

The FRMPs were adopted by the National Water Council and published in the Government Gazette on 5 July 2018 (for EL01, Western Peloponnese; EL10, Central Macedonia; and the

FRMP for the Evros sub-basin, EL1210, which is part of EL12, Thrace) and on 6 July 2018 (for all other UoMs).

Table 1 below gives an overview of all UoMs in Greece, including the UoM code, the name, and the number of APSFRs reported. It also indicates whether the UoM reported all documents required to the European Environment Agency's (EEA) WISE[4] – the FRMP as a PDF and the reporting sheet as an XML.

Table 1 Overview of UoMs in Greece

UoM	Name	Number of APSFRs	XML reported	PDF Reported
EL01	WESTERN PELOPONNESE	4	Yes	Yes
EL02	NORTHERN PELOPONNESE	8	Yes	Yes
EL03	EASTERN PELOPONNESE	7	Yes	Yes
EL04	WESTERN STEREA ELLADA	6	Yes	Yes
EL05	EPIRUS	10	Yes	Yes
EL06	ATTICA	9	Yes	Yes
EL07	EASTERN STEREA ELLADA	19	Yes	Yes
EL08	THESSALIA	9	Yes	Yes
EL09	WESTERN MACEDONIA	13	Yes	Yes
EL10	CENTRAL MACEDONIA	9	Yes	Yes
EL11	EASTERN MACEDONIA	5	Yes	Yes
EL12	THRACE	4	Yes	Yes
EL13	CRETE	10	Yes	Yes
EL14	AEGEAN ISLANDS	11	Yes	Yes
TOTAL		**124**	**14/14**	**14/14**

The FRMPs can be downloaded from the following website[5]:

- https://floods.ypeka.gr/index.php?option=com_content&view=article&id=11&Itemid=504 (Individual FRMPs can be found by selecting the specific UoM and then the link to the FRMP for EL01, for example: http://floods.ypeka.gr/egyFloods/sdkp/EL01/FEK_B_2640_05072018.pdf)

Overview of the assessment

Table 2 below gives an overview of the evidence found during the process of assessing the FRMPs. It uses the following categorisation in the column for evidence:

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

[5] Please note that the website was under construction at the time of the review.

- **Evidence to the contrary**: the assessment found an explicit statement stating that the criterion was not met;
- **No evidence**: no information found to indicate whether the criterion was met;
- **Some evidence**: the reference to the criterion is brief and vague, without a clear indication of the approach used. Depending on the comment in the adjacent column, 'some evidence' could also be construed as 'weak evidence', particularly if it indicates that no details are provided;
- **Strong evidence**: clear information provided, describing the approach taken in the FRMP to address the criterion.

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

Criterion	Evidence	Comments
FRM objectives have been established	Strong evidence	A common set of four general objectives are established and applicable to all 14 UoM-level FRMPs (with different, more specific objectives set out in the FRMP for the Evros sub-basin).
FRM objectives relate to...		
...the reduction of potential adverse consequences	Some evidence	The aim of the general objectives of the 14 UoM-level FRMPs is to reduce the potential adverse consequences of flooding, though this is not specified in the objectives themselves. It is also not stated in the more specific objectives presented in the Evros sub-basin FRMP, though it would be a result of the objectives to increase flood protection.
...to the reduction of the likelihood of flooding	Strong evidence	Reducing the likelihood of flooding is one of Greece's four general objectives. (This aim is not, however, specified in the objectives for the Evros FRMP.)
...to non-structural initiatives	Some evidence	Only the objectives for the Evros sub-basin FRMP refer to non-structural measures.
FRM objectives consider relevant potential adverse consequences to...		
...human health	Some evidence	While not specifically stated in the general objectives themselves, the FRMPs state that the objectives aim to mitigate potentially negative effects of floods on human health, economic, activity, the environment or cultural heritage.
...economic activity		
...environment		
...cultural heritage		
Measures have been...		
...identified	Strong evidence	Greece has reported 119 individual measures and 263 aggregated measures; a total of 382 measures. The FRMPs identify measures addressing flood risk that were in place before the plans were developed.

Criterion	Evidence	Comments
...prioritised	Some evidence	Greece has reported that 179 out of the 382 measures are a priority. The UoM-level FRMPs rank the measures based on their cost-effectiveness but do not explain how the ranking is related to the prioritisation of measures.
Relevant aspects of Article 7 have been taken into account such as...		
...costs & benefits	Some evidence	An analysis of the cost-effectiveness of measures has been conducted, but only for selected measures.
...flood extent	Some evidence	The FHRMs provide information on flood extent and the FRMPs assessed state that the maps were used to select the measures, though details on the method are not provided.
...flood conveyance	No evidence	In the FRMPs assessed, the descriptions of previous steps under the Floods Directive (preliminary flood risk assessment and flood and hazard risk maps) do not mention flood conveyance.
…water retention	Some evidence	Two measures related to natural water retention measures are included in each of the 14 UoM-level FRMPs (and one in the Evros FRMP). However, there were no further references to water retention in the FRMPs or reporting sheets.
...environmental objectives of the WFD	Some evidence	The UoM-level FRMPs assessed state that the WFD objectives were considered, but they do not provide details.
...spatial planning/land use	Some evidence	Each of the 14 UoM-level FRMPs contains a single measure related to land use. The FRMPs assessed also mention spatial planning and ongoing land use measures.
...nature conservation	Some evidence	The UoM-level FRMPs assessed each include a single national measure category identified as addressing nature protection, and the Evros sub-basin FRMP contains a measure to assess the impacts of floods on the Evros Delta. However, the FRMPs do not mention whether nature protection has been further considered, for example in developing the measures more generally.
...navigation/port infrastructure	No evidence	No information found in the FRMPs assessed or in the reporting sheets.
...likely impact of climate change	Some evidence	The FRMPs assessed describe how measures were assessed against potential climate impacts. (However, they did not detail the type of potential climate impacts.) The FRMPs also note that further

Criterion	Evidence	Comments
		work is planned for the second cycle of FRMPs.
Coordination with other countries ensured in the RBD/UoM	Some evidence	For the Epirus UoM (EL05), the FRMP describes overall agreements and meetings with Albania for the Aoos shared sub-basin but does not indicate whether the identification of flood risk areas was coordinated. The FRMPs for Thrace (EL12) and its Evros sub-basin (EL1210) state that Greece exchanged information with Bulgaria on methodologies and criteria for identifying the APSFRs and FHRMs and on consultation activities and measures, and identified a transboundary APSFR. In addition, Greece exchanged information with Turkey on the Evros sub-basin.
Coordination ensured with WFD	Some evidence	FRMP and RBMP authorities coordinated their work, a joint consultation event was held in each UoM, and the objectives of the Floods Directive were factored into the preparation of the RBMPs. However, Greece's reporting sheets and FRMPs do not provide details on this coordination work. Moreover, the reports do not indicate whether Article 4(7) of the WFD has been applied or whether new and existing structural measures will be adapted to take into account the WFD objectives.
Active involvement of interested parties	Some evidence	Greece held meetings with the national ministries concerned, and held an event for stakeholders in each UoM.

Good practice

The assessment identified the following good practice in the Greek FRMPs that were assessed.

Table 3 Good practice in the Greek FRMPs

Topic area	Good practice identified
Integration of previously reported information	The FRMPs comprehensively describe the PFRA and FHRM approach taken and their results, which followed a common national methodology.
Objectives	Public consultation included a survey question on the general objectives.
Planned measures for the achievement of objectives	For each measure, the FRMPs provide an information sheet containing key information (including an estimation of costs per measure). Although this is not fully detailed, the information sheets will aid the process of developing the measures and of monitoring their implementation. Greece has set out plans to develop a monitoring system to track progress in implementation, although it is not fully specified in the FRMPs (a baseline is not specified and indicators were proposed but not decided).
Consideration of Climate	The FRMPs considered climate change and its potential effects in several

Topic area	Good practice identified
Change	aspects, as well as the national climate change adaptation strategy. The plans also indicate that the permitting of measures will consider potential climate impacts.
Cost-benefit analysis	A cost-effectiveness assessment (CEA)was conducted for the measures selected.
Governance	Joint events were held with the Water Directorates at regional level to develop the second cycle of RBMPs and the first cycle of FRMPs to ensure consistency between the measures of these plans. A report for each UoM summarises the consultation process, including participant lists, summaries of every event, a record of all comments received and the responses to them.

Areas for further development

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

Table 4 Areas for further development in the Greek FRMPs

Topic area	Areas for further development identified
Integration of previously reported information	The links between the FRMP for Thrace, EL12, and the FRMP for the Evros sub-basin within that UoM (EL1210) are not clearly described in either plan, nor in Greece's reporting sheets. Although the FRMPs report that the FHRMs were taken into account in the selection of measures, it does not describe the specific methods used to link FHRMs and measures. Since the FHRMs do not cover all relevant flood sources, the FRMPs do not cover all significant sources of flooding either.
Setting objectives	The general objectives are not clearly specific nor measurable (though one FRMP refers to measuring the objectives in terms of project outcomes). As a result, it is unclear whether the flood risk management goals set out in these objectives would be achieved if all measures are implemented. The FRMPs do not explain the links between the more specific objectives of the Evros FRMP (EL1210) and the general objectives cited in the FRMP for Thrace (EL12), of which the Evros sub-basin is a part.
Planned measures for the achievement of objectives	The links between the measures for Thrace (EL12) and those for its Evros sub-basin are not specified; it is not clear why this UoM has two FRMPs with approximately double the number of measures planned as all other UoMs. Although beneficial for continuity of management, the FRMPs do not explain how implemented actions contribute to flood risk management (i.e. actions in place before the plans were drawn up) or how they coordinate with and are linked to the objectives and measures set out in the FRMPs. The measures are only partly specific and measurable. Information is lacking on what exactly each measure tries to achieve and how, as are results in terms of their potential contribution to reaching the objectives. The process of selecting and prioritising measures is not clearly described. In addition, the information reported to WISE regarding prioritisation is not included in the FRMPs, and the link between the cost-effectiveness ranking of

Topic area	Areas for further development identified
	measures and their overall prioritisation in the FRMP is not explained. The timeline for implementing the measures is not fully clear, and this can hinder monitoring of progress in implementation. Coordination with the WFD has been limited, with main efforts focusing on links between measures under the FRMPs and the RBMPs. Only very limited and general consideration is given to measures on land use and spatial planning for flood management, and there is no reference to halting or limiting development in floodplains that could increase flood risks. Although two measures can promote NWRM, the information provided is not detailed and the FRMPs do not highlight the potential role of NWRM. Generally, the use of nature based solutions should be strengthened. A high share of the total costs will go on measures that could include riverbank and riverbed modifications, with possible negatively impacts on the ecological and hydromorphological conditions of streams and rivers. Although the FRMPs refer to Article 4(7) of the Water Framework Directive, they do not provide information on how the provisions will be implemented.
Cost-benefit analysis	The CEA conducted only covers already selected measures: it was not used to make a selection of measures from a list of possible measures. The FRMPs report that the subsequent ranking of the measures was considered in their prioritisation, but it is not clarified how this was carried out. The Evros FRMP does not indicate whether a screening was carried out to identify potential measures with transboundary effects (and a CBA was not conducted for such measures, either for this or for other FRMPs).
Governance	The legal and regulatory framework governing flood protection in Greece appears complex. Stakeholders were actively involved in developing the FRMP only to a limited extent. The FRMPs do not specify or summarise the changes made in response to the public consultation. The final SEA reports for Greece's FRMPs are not available for download from the national FRMP website.

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):

- Greece should prepare the next cycle of FRMPs in line with the timetable set in the Floods Directive, to ensure the second cycle of FRMPs are adopted on schedule.
- Greece should clarify the links between the FRMP for Thrace (EL12), and the FRMP for the Evros sub-basin (EL1210), including the links between the objectives and the measures set out in the two plans.
- The FRMPs should explain how the FHRM work was used to select measures (it may also be useful to provide specific examples illustrating these links).

- The FRMPs should be based on an assessment of all significant sources of flooding.
- Greece should develop specific and measurable objectives (these could potentially be sub-objectives under the set of common, general objectives). On this basis, the FRMPs can indicate how the objectives will be achieved, in terms of improving flood risk management by implementing the measures.
- The FRMPs should set out the links between the actions already implemented and the objectives and measures of the FRMPs themselves. They should also identify mechanisms to improve synergies if necessary so that the plans provide a more complete framework of flood risk management.
- The description of the measures in the FRMPs should be more specific, indicating what will be achieved and how this will be measured (including how they will contribute to reaching the objectives).
- The FRMPs should clearly specify the process of selecting and prioritising measures. In addition, the plans should include information reported to WISE regarding prioritisation, and they should explain the link between the cost-effectiveness ranking of measures and their overall prioritisation.
- The timeline for implementing the measures should be more specific, which would also facilitate monitoring of progress in implementation.
- Though Greece has begun coordination with the WFD, this should increase.
- Further consideration should be given to the potential of measures on land use and spatial planning, especially measures to halt or limit development in floodplains.
- Measures that may include riverbank and riverbed modifications or other works that could negatively affect aspects such as the ecological and hydromorphological conditions of water bodies should be fully assessed under environmental regulations. This assessment should include looking at alternatives and modifications to mitigate their impacts.
- The FRMPs should give greater attention to opportunities for NWRM as part of a broader refocus on greener, win-win approaches. Specific pilot projects (such as the project proposed for the Evros sub-basin) could show the specific potential of NWRM.
- Although the plans do consider climate change to some extent, the second cycle of plans should incorporate climate change more generally into flood risk management objectives and in the selection of measures.
- An analysis of costs and benefits should be applied to all possible measures, not only to the selected measures, but also used to select the most effective measures.
- All FRMPs for transboundary UoMs and sub-basins should undergo a screening process to identify potential measures with transboundary effect. If this identifies such measures, a cost-benefit analysis should then be carried out, based on a methodologies agreed with the neighbouring countries.

- It would be advisable to streamline the legal and regulatory framework governing flood protection in Greece, including the interactions between and cooperation with related authorities, in order to increase transparency, clearly set out the responsibilities and support sufficient funding and staffing and capacity needs.
- Greece should boost the active involvement of private-sector stakeholders and civil society in developing the FRMPs, for example by creating advisory committees.
- The FRMPs should summarise the changes made in response to public consultations.
- The final SEA reports for Greece's FRMPs should be made available via the national FRMP website.

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

1.1 Reporting of the FRMPs

Greece has reported FRMPs for all 14 UoMs. However, information was only reported to the European Commission in late 2018, making the submission very late. The FRMPs were to be published by December 2015 and reported by March 2016 to the European Commission. This meant that the Greek FRMPs could not be assessed as part of the European Commission's assessment of the EU FRMPs, published in 2019. This assessment has been prepared separately.

Greece 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, except for the Thrace UoM (EL12), where an additional FRMP was prepared for one sub-basin, the Evros (EL1210)[6]. The assessment covered the Thrace UoM and included both these FRMPs: consequently, six FRMPs – five UoM-level FRMPs and one sub-basin FRMP – covering five UoMs were assessed.

In addition, Greece reported to WISE five documents at national level that have been used for the development of all FRMPs. These are:

1. The common terms of reference for the consultancy projects supporting the development of the FRMP for all UoM (26 pages);
2. A national methodology for the development of intensity-duration-frequency (IDF) rainfall curves, including data used per UoM (61 pages);
3. A national soil erodability methodology (2 pages)

[6] There are a few interlinkages between the FRMP for Thrace and the FRMP for the Evros sub-basin of this UoM. The Thrace FRMP covers the Evros sub-basin in its general introductory chapters and its presentation of the UoM characteristics and the preliminary flood risk assessment. This FRMP refers to the separate FRMP for the Evros sub-basin, which includes three of the four APSFRs identified in the UoM (pp. 32773). The FRMP for the Evros sub-basin states that the information regarding the PFRA and APSFRs (Chapter 4, pp. 29504 to 29509) was updated compared to an earlier assessment. The Thrace FRMP contains 28 measures, while the Evros FRMP contains 23. No information linking the measures of the two plans were found.

4. A national calculation method for the runoff curve number (C_n)[7], predicting direct runoff or infiltration from rainfall excess, based on a US methodology[8] (16 pages);
5. A national flood vulnerability and risk assessment methodology.[9]

1.2 Assessment of the FRMPs

The selection of UoMs sought to cover a broad range of flood sources (based on those reported in the FHRMs[10]), provide a geographical distribution (North-South and mainland/islands), include UoMs with large agglomerations and those without, and include transboundary UoMs. The following UoMs were chosen:

- EL01 (Western Peloponnese): affected by fluvial and coastal flood sources
- EL05 (Epirus): a transboundary UoM, shared with Albania; fluvial and coastal flood sources
- EL06 (Attica): contains the Athens-Piraeus urban area, Greece's largest; fluvial flood sources
- EL12 (Thrace): a transboundary UoM, shared with Bulgaria and Turkey; fluvial flood sources
- EL14 (Aegean Islands): covers numerous islands; fluvial and coastal flood sources

Table 5 Greek UoMs assessed

UoM code	UoM Name
EL01	Western Peloponnese
EL05	Epirus
EL06	Attica
EL12	Thrace
EL14	Aegean Islands

[7] C_n is an empirical parameter used in hydrology for predicting direct runoff or infiltration from rainfall excess.

[8] Greece used the methodology of the Soil Conservation Service of the US Agriculture Ministry USDA, renamed to Natural Resources Conservation Service (the FRMPs refer to the SCS/NCRS methodology)

[9] In this document, it is stated that the methodology will be applied for EL01, EL02, EL03, EL11, EL12 and EL13 (page 8). Nonetheless, the FRMPs show that this methodology was applied for all UoMs.

[10] European Commission, Assessment of Flood Hazard and Flood Risk Maps – Member State Report: EL – Greece, 2018 (page 8). Available at:
https://ec.europa.eu/environment/water/flood_risk/pdf/fhrm_reports/EL%20FHRM%20Report.pdf

2. Integration of previously reported information

2.1 Conclusions drawn from the preliminary flood risk assessment

The process for developing the Preliminary Flood Risk Assessments (PFRAs) and their results are described in detail in all FRMPs (in chapter 5.1), as a textual description, in tables and in some FRMPs also in maps.

For the five UoM-level FRMPs assessed, the methodology for the identification of APSFRs is then presented in chapter 5.2, along with the areas identified: the latter are presented as textual descriptions and in tables and maps[11]. The APSFRs are shown in a table and in a summary map showing all APSFRs of the UoM. Chapter 6 then describes in detail the characteristics of each APSFR identified. The methods for developing flood hazard and risk maps, a textual analysis of the maps developed, most maps and links to the flood hazard[12] and risk[13] maps themselves (also showing the APSFRs) are provided in chapter 7 and 8. The FRMPs themselves, however, do not present detailed maps of each APSFR.

In the transboundary UoMs, shared APSFRs or other flood risk areas are not shown on maps (nonetheless, in the Evros sub-basin, EL1210, a transboundary APSFR has been defined with Bulgaria along a 12 km stretch at the border between the two countries).

The descriptions of the PRFA methodology in the FRMPs do not mention conveyance routes.

2.1.1 Coordination with neighbouring Member States on shared RBDs/UoMs

Each of the FRMPs assessed for transboundary UoMs describe overall coordination activities (in chapter 13)[14]; these are also presented in the reporting sheets.

Regarding the identification of flood risk areas:

[11] For the Evros FRMP, the methodology for the identification of APSFRs is presented in chapter 4.2, along with the areas identified: the latter are presented as textual descriptions and in tables and maps. The APSFRs are shown in a table and in a summary map showing all APSFRs of the UoM. The characteristics of each APSFR identified are not described in detail. The methods for developing flood hazard and risk maps, a textual analysis of the maps developed, most maps and the links to the full list of flood hazard and risk maps themselves also showing the APSFRs are provided in chapters 5 and 6. Yet, not one detailed map per APSFR is presented.

[12] https://floods.ypeka.gr/index.php?option=com_content&view=article&id=9&Itemid=502

[13] https://floods.ypeka.gr/index.php?option=com_content&view=article&id=10&Itemid=503

[14] For the Evros FRMP, this information is found in chapter 2. In chapter 8.5.7, future directions for a stronger transboundary cooperation are discussed.

- In the Epirus UoM, EL05, the Aoos sub-basin (containing the Prespa Lakes and the Drin River) is shared with Albania. The FRMP for this UoM describes the overall agreements and relevant meetings regarding transboundary consultation but does not specify if or how the identification of flood risk areas (or the development of FHRMs) has been coordinated.
- In the Thrace UoM, EL12, the Nestos sub-basin is shared with Bulgaria and the Evros sub-basin is shared with Bulgaria and Turkey.

Cooperation with Bulgaria is based on a Joint Management Declaration for Cooperation in the Area of Water: in this context, a joint expert working group was established in 2011. Three sub-working groups have then been set up, one of them dealing with the technical information needed for the implementation of the WFD and FD. In the context of four meetings from 2012 to 2018, this subgroup exchanged information on:

- the methodology and criteria used in the two countries for the establishment of APSFRs;
- the methodologies of developing the flood risk and hazard maps; in this context, Bulgaria provided maximum flows of the transboundary rivers at the shared border for return periods of 20, 50, 100 and 100 years, inter alia for the Nestos River;
- the consultation activities and the measures.

More specifically, in 2014 it was agreed:

- that each country assesses the flood hazard and risk and then this information is exchanged;
- to coordinate measures that are required upstream and downstream in order to reduce flood risk;
- to coordinate activities regarding public consultation.

In 2017, the joint expert working group discussed how to improve coordination for the 2nd cycle of FRMPs, based on the results of the cooperation for the first cycle. In 2018, the working group discussed implementation of the FD in both countries and agreed to reinforce cooperation in the future for the transboundary areas.

Thus, it can be concluded that there was exchange of information on APSFR definition and on FHRM development but not a coordination of methodologies.

For the Evros sub-basin (E112), part of the Thrace UoM, the basin FRMP provides information on cooperation with Bulgaria and Turkey[15]. As noted above, a transboundary APSFR has been defined on the Evros River along the border with Bulgaria[16]. Greece and Turkey have established an ad-hoc joint committee for cooperation regarding the Evros River, and a working group has exchanged quantitative and qualitative information collected by each country (see also chapter 2.2.1), but the FRMP and reporting sheets do not specifically refer to cooperation at the PFRA stage. The most recent meetings of the bilateral working groups took place in June 2017 for the Bulgaria-Greece working group and September 2011 for the Greece-Turkey working group[17].

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

Chapter 7 and 8 of the FRMPs assessed (in the Evros FRMP, chapters 5 and 6) elaborate on the development of the flood risk and hazard maps (including soil erosion) and their results, providing both a textual description as well as the maps themselves. Links to the maps online are also provided.

In the FRMPs assessed, there is no information provided on possible revisions of the risk areas needed for the preparation of the FHRMs; it can be assumed that the process of developing the FHRMs confirmed the findings of the PFRA.

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

In the FRMPs assessed, the specific sources of flooding for each APSFR are not clearly defined, nor further discussed on a case-by-case basis, and no direct link to the flood sources is identified on the maps produced; in chapters 5.3 and 5.4 of the FRMPs (missing in the Evros FRMP, since the information is covered in the FRMP for the Thrace UoM overall, EL12), however, the causes and mechanisms for floods are described for each APSFR.

Across all 14 of Greece's UoMs, the following flood sources have been mapped/considered[18]:

[15] Information on transboundary cooperation found in the reporting sheet for the Evros sub-basin and in the Evros FRMP, chapter 2.2.

[16] At the same time, for the Ardas river which is transboundary and which is part of the Evros sub-basin, Greece defined an APSFR downstream of the border, but Bulgaria did not define one upstream of the border.

[17] Evros FRMP, pp. 29496 and 29497.

[18] As examples: in the FRMP for Attica, EL06 (pp. 34623-4), it is mentioned that the main source of flooding is fluvial, but pluvial and artificial water-bearing infrastructure sources are mentioned as secondary sources. Yet, it is stated, based on the specifications of the terms of reference for the development of the FRMP, that generally only fluvial and sea-level rise flooding are considered as sources.

- Fluvial: all UoMs
- Coastal floods/sea level rise in eight UoMs: Western Peloponnese, EL01; Northern Peloponnese, EL02; Western Sterea Ellada, EL04; Epirus, EL05; Western Macedonia, EL09; Central Macedonia, EL10; Thrace, EL12; Aegean Islands, EL14.

The flood hazard maps are described in chapter 7.2 of each FRMP assessed per APSFR and presented on a map per flooding scenario for the entire UoM (the FRMP for the Evros, EL1210, is an exception: flood hazard maps are described in its chapter 5.2, with less detail than the other FRMPs assessed, and only one map is provided). A link[19] is provided in the FRMPs to more detailed maps and their structure is explained (the more detailed online maps do not, however, cover each APSFR, as noted in the FHRM Assessment Report[20]).

The development of flood risk maps is described in chapter 8 of the FRMPs (chapter 6 in the Evros FRMP), with the results described in chapter 8.3.3. per APSFR and summary maps given for all APSFRs in the UoM (missing in the Evros FRMP). The overall structure of the maps is provided in chapter 8.5, including the link to the available Flood risk maps (chapter 6.1 in the Evros FRMP, with only a brief description).

2.2.1 Maps for shared flood risk areas

A common flood hazard and flood risk map has not been prepared for the flood risk area shared with neighbouring Bulgaria, the only transboundary flood risk area identified in the FRMPs assessed (see section 2.1.1 above).

Similarly, the FRMP for the Aegean Islands, EL14 (pp. 30955), identifies fluvial and pluvial as the main sources of flooding, but with the same explanation (i.e. that it is not part of the ToR's requirements) pluvial flooding is not further considered in the FRMP.

The FRMP for the Western Peloponnese UoM, EL01 (also in chapter 5.3, pp. 29682 to 29689) presents a textual description of the flood sources per APSFR, but with no overall result. Here too, only fluvial and sea level rise maps have been produced.

[19] The overall link for flood hazard maps is:

https://floods.ypeka.gr/index.php?option=com_content&view=article&id=9&Itemid=502.

The overall link for the flood risk maps is:

https://floods.ypeka.gr/index.php?option=com_content&view=article&id=10&Itemid=503.

Specific links for the UoM are provided in chapter 7.3 of each FRMP; for the Evros FRMP it is chapter 5.1.

[20] The FHRM report states (pp. 5-6): "Maps are not per APSFR, but according to rectangular "areas" which are different (there is no definition given on what such an "area" is). Since there are more "areas" than APSFR, this leads to a high number of maps, reducing significantly the understanding for the public user. While there are some explanations given regarding the contents/aims of the maps, there is no user friendly way with regards to which maps an interested user should look at in order to appreciate the potential flood situation in a specific area/APSFR." European Commission, Assessment of Flood Hazard and Flood Risk Maps – Member State Report: EL – Greece, 2018. Available at:

https://ec.europa.eu/environment/water/flood_risk/pdf/fhrm_reports/EL%20FHRM%20Report.pdf

For the Evros sub-basin, the following coordination steps were taken with Bulgaria:

- The two countries coordinated the return periods for their hazard assessments (since Greece uses 20 years and Bulgaria 50 years for the high probability scenario, both were included for the shared part of the Evros River);
- Information was exchanged regarding the assessment methodologies for flood hazard and risk;
- Detailed information was exchanged regarding topography, digital/hydrological models and peak flows.

As noted above (section 2.1.1), Greece and Turkey have established an ad-hoc joint committee for cooperation on the Evros River: in the context of the working group for information sharing, Turkey provided hydrometric information from 2005 on, which was used by Greece for hydrological analysis leading to the FHRM for the Evros River. (While Greece has cooperated with both Bulgaria and Turkey on flood issues in the Evros, the FRMPs do not mention any trilateral meetings or exchanges of information.)

2.2.2 Conclusions drawn from the flood hazard and flood risk maps

The FRMPs state, when describing the general objectives of flood risk management, that for the selection of measures, the following has been taken into account (chapter 9.3 of each FRMP assessed, but for the Evros FRMP, different text is provided in chapter 7.1 on the issue):

- the objectives of flood risk management the measures serve;
- the results of the analysis/assessment of the flood hazard maps, on which basis the protection levels against flooding in each area are established;
- the results of the analysis/assessment of the flood risk maps, which are used to determine the effects on human health, the environment, the cultural heritage and economic activities;
- the local circumstances of each area (including land use, economic activities and technical infrastructure, development trends, project/works programming, and available financing)

Each of the FRMPs assessed also state that the plan concerns the APSFRs and is "developed based on the results of the Flood Hazard and Risk maps"[21] (and as noted above, links to the maps are provided in the FRMPs).

[21] Chapter 10.1 (This specification is missing in the relevant chapter, 8.1, of the Evros FRMP). Chapter 10.1 of each FRMP (except the Evros FRMP) also clarifies under which conditions flood-related measures can be financed in areas outside the APSFRs.

Consequently, the FHRMs have "inspired" the development of the FRMPs and the selection of measures, but the FRMPs do not provide specific details on the process.

2.3 Changes to the APSFRs or other Flood Risk Areas

Any changes in the identification of APSFRs or other Flood Risk Areas since the PRFA stage should be reflected in the FRMP. No information was found in the FRMPs concerning any such changes; the terms of reference of the consultancy for the preparation of the FRMPs[22] indicate that the previously identified APSFRs are to be used, so it can be assumed that the APSFRs reported in 2014-2017 in the FHRMs are the same as those addressed in the FRMPs.

The FRMPs assessed do not report any changes regarding the Flood Hazard and Flood Risk Maps since they were prepared; indeed, the maps were not prepared in time for the Directive's deadline (December 2013) and instead were developed in the same process as the FRMPs.

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

The assessment of the FHRMs[23] identified the following substantive areas for further development for Greece:

- The flood risk and hazard maps in Greece are organised and presented in a very complex way and are numerous, potentially making it difficult for the public to understand them;
- It is unclear why some types of flood sources, such as pluvial flooding, have apparently not been considered.

Regarding the first point, Greece informed in 2018 that an interactive map viewer will be added to the relevant internet site in order to increase user friendliness. This map viewer has been available since November 2019 at the national flood risk website (https://floods.ypeka.gr/)[24]. Yet this map viewer does not change the complex nature of the information provided, nor the high number of maps available.

[22] Greece reported the ToRs to WISE. They are available at: https://cdr.eionet.europa.eu/gr/eu/frmp/national/envw9hfwg/FRMP_National_Specifications.pdf

[23] European Commission, Assessment of Flood Hazard and Flood Risk Maps – Member State Report: EL- Greece, 2018. Available at: https://ec.europa.eu/environment/water/flood_risk/pdf/fhrm_reports/EL%20FHRM%20Report.pdf

[24] Specifically at: floods.ypeka.gr:8080/mapbender/app.php/application/Greece_Floods_Map_2019_v02 [copy/paste into the browser]

Regarding the second point, Greece informed in 2018 (in the context of the finalisation of the 2018 Assessment of Flood Hazard and Flood Risk Maps) that the most dominant types of flooding in Greece are fluvial floods (including lake overflows in cases where rivers end at or cross lakes and reservoirs) and floods from sea level rise (in APSFRs where a sea level rise greater than 1m is expected)[25]. This explanation is found also in the relevant chapters of the FRMPs. Nevertheless, this does not correspond the initial findings of the PFRA, where additional flood types (in particular pluvial floods) were identified: these additional flood types have not been considered in the FRMPs. In addition, the FRMPs themselves indicate in various cases that other flood sources, such as pluvial floods, are also significant (chapter 2.2 of the FRMPs assessed). This information is not taken further and it appears that no specific measures have been planned for these other types of floods, since the flood hazard and risk maps provide the basis for the development of the FRMPs and the selection of their measures[26] (and the maps only depict fluvial and coastal/sea level rise flooding).

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

The following **good practices** were identified:

- The FRMPs comprehensively describe the approach applied for the PFRA and the FHRMs, which followed a common national methodology, and their results.

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

- The links between the FRMP for Thrace, EL12, and the FRMP for the Evros basin within that UoM (EL1210) are not clearly described in either plan nor in Greece's reporting sheets.
- While the FRMPs report that the FHRMs were taken into account in the selection of measures, the specific methods used to link FHRMs and measures are not described.
- Since the FHRMs do not address all relevant flood sources, the FRMPs also are not based on a consideration of all significant sources of flooding.

[25] European Commission, Assessment of Flood Hazard and Flood Risk Maps – Member State Report: EL- Greece, 2018, footnote 4, pp. 1.

[26] Statement found on chapter 10.1. of the UoM-level FRMPs; for example, for the FRMP for Western Peloponnese, EL01, on pp. 29806.

3. Setting of Objectives

3.1 Focus of objectives

In the chapter 9.3 of all the FRMPs assessed (except the Evros sub-basin) as well as in the reporting sheets, four general objectives common to all UoMs are set. These general objectives aim at the reduction of flood risk specifically in the APSFRs. They are:

1. Mitigation of flood exposure (Management Objective S1)
2. Reduction of the likelihood of flooding (Management Objective S2)
3. Strengthening preparedness for flood management (Management Objective S3)
4. Improvement of the mechanisms for the recovery of affected areas (Management Objective S4).

These general objectives were selected to correspond to the four main aspects of flood risk management (prevention, protection and preparedness, and recovery and review – see Annex B). The FRMP explain that the general objectives are of a strategic nature, in order to consolidate a common understanding and policy on the issues related to flood risk management. Some measures can support more than one objective. Consequently, the objectives set are generic rather than specific.

The FRMP for the Evros sub-basin (EL1210) presents a different set of objectives[27]. Here, the four general objectives are not mentioned; rather, five specific objectives for this basin are presented.[28] These are:

- S1: Ensuring a level of flood protection for an average probability of occurrence (T = 100 years) by restoring and completing the enclosure of the area defined by primary flood protection projects (rehabilitation, reinforcement or extension of existing main embankments and other ancillary projects) and developing a management framework for this area (addressing land uses and activities, conditions for increased readiness and identification of emergency actions).
- S2: Flood protection for a high probability of occurrence (T = 20 and 50 years), including actions to restore the level of protection of secondary flood protection works (called "summer" or "excess" embankments).
- S3: Prevention, protection and increase of preparedness for flood events due mainly to anthropogenic causes (in particular dam failure) and for flood events whose co-

[27] Evros sub-basin (part of EL12) FRMP, chapters 7.1 to 7.3, pp. 29536 to 29542.

[28] Evros FRMP, pp. 29537.

formation due to anthropogenic causes significantly changes their physical characteristics, such as their magnitude or the timing of flood peak (dam overflow).

- S4: Protection and increase of preparedness for flood events due to sea level rise.
- S5: Acquisition, improvement and organisation of information related to flood protection infrastructure and reduction of uncertainties related to the assessment of flood hazard and risk.

For each of these, the related flood events are described, their content further specified, the APSFRs for which each objective is relevant are listed as well as a specification and prioritisation of the objectives per APSFR developed.

The objectives in the Evros sub-basin are thus different from those in the Thrace UoM, EL12, of which it is a part. The UoM-level FRMPs and the reporting sheets state that the general objectives cover all UoMs. Neither the FRMP for the Evros nor that for Thrace, however, discusses links between these two sets of objectives.

The common general objectives for the five UoM-level FRMPs assessed aim at reducing the adverse consequences of floods as well as of the likelihood of flood risk. They do not, however, refer to coordination with neighbouring countries, nor to measures to be implemented.

The objectives for the Evros sub-basin also aim at reducing the adverse consequences of floods, and they refer to measures to be implemented, including non-structural measures. The Evros objectives also do not refer to coordination with neighbouring countries.

3.2 Specific and measurable objectives

The UoM-level FRMPs assessed do not identify quantitative targets linked to the general objectives. Moreover, these objectives are not linked to specific locations; rather they cover all UoMs. While the FRMPs do not refer to a timeframe for achieving the objectives, the reporting sheets clarify that it is linked to the timeframe for the FRMP measures, that is from 2016 to 2021.

These general objectives, as set out in the UoM-level FRMPs and the reporting sheets, are neither specific nor clearly measurable, since no specific quantitative target given, no specification on the exact location at which the objectives will be achieved and only a general linkage to the measures selected exists.

Some further information is provided in one plan: the FRMP for the Epirus UoM (EL05) states[29] that the fulfilment of its objectives is to be quantified as the percentage of implementation of measures in each aspect (prevention, protection, preparedness, recovery and review), though information was not found elsewhere to indicate if this is the case also for other UoM-level FRMPs. In the FRMP for Epirus, the information sheets for each measure[30] list the relevant objective or objectives to which the measure is contributing. This FRMP does not, however, provide information on the timing for achieving the objectives. The objectives in this FRMP consequently are measurable in terms of outcomes of project implementation but not in terms of flood risk itself (for example, the extent to which the likelihood of flooding has been reduced). Moreover, the objectives are not fully specific, as a timeline is not set out.

The objectives for the Evros sub-basin are more specific and moreover a specification and prioritisation of these objectives is provided for each APSFR. These objectives are thus more specific than the general objectives. Consequently, these objectives are also more measurable; nonetheless, no information is provided in this FRMP on mechanisms to measure the achievement of the objectives.

3.3 Objectives to reduce adverse consequences from floods

While the general objectives do not specifically refer to the reduction of adverse consequences of flooding, the UoM-level FRMPs assessed[31] and the reporting sheets state that achieving the four general objectives will mitigate the potentially negative effects of floods on human health, the environment, cultural heritage and economic activities.

The objectives for the Evros sub-basin also do not refer specifically to reducing adverse consequences of flooding; they do call for the implementation of flood protection actions, so the reduction of adverse consequences is an aim.

3.4 Objectives to address the reduction of the likelihood of flooding

One of the four general objectives is the reduction of the likelihood of flooding, though no further specification of this objective is provided.

[29] EL05 FRMP, Chapter 10.3, pp. 31540; statement not found in the FRMPs (chapter 10.3) for EL01, EL06, EL12, Evros sub-basin (EL1210, part of EL12; relevant chapter here: 8.1) and EL14.

[30] EL05 FRMP, Chapter 10.3

[31] FRMPs, chapters 9.3

The objectives of the FRMP for the Evros sub-basin do not specifically refer to reducing the likelihood of flooding, though this may result from objectives such as the development of a management framework.

3.5 Process for setting the objectives

The UoM-level FRMPs assessed briefly mention (in chapter 9.3) that the general objectives were set based on the requirements of the Floods Directive and on relevant EU-level guidance and that they were developed in cooperation with the national government's Special Secretariat for Water.[32]

All the UoM-level FRMPs indicate that the objectives have been subject to public consultation, since the questionnaires to authorities and the public included a "yes-no" question on agreement with the general objectives set and a space for comments (for more details see section 7 below)[33].

The Evros FRMP states[34] that its objectives are set based on: the requirements of the Floods Directive and relevant EU-guidance; analysis of the area done before the development of the risk maps; experience with the effects of floods in the area; and the priorities for the implementation of measures for the first FRMP for the area in order to reduce uncertainties linked to the analysis of flood events (due to the need for transboundary cooperation on many topics, the internal "weaknesses" and gaps regarding the required information).

Although the links to climate change are mentioned in all the FRMPs assessed[35], there is no information in the FRMPs to indicate whether or how climate change has influenced the definition of objectives (please see section 5 below for more information regarding climate change).

3.6 Good practices and areas for further development regarding setting objectives

The following **good practices** were identified:

- Public consultation included a survey question on the general objectives.

[32] Chapter 9.3 of the UoM-level FRMPs.

[33] Chapter 11 of the UoM-level FRMPs and chapter 9 of the Evros FRMP.

[34] Chapter 7.1

[35] In particular, in chapter 7.1.6, in the information sheets per measure in chapter 10.3 in and chapter 12.1 (actions for reaching the objectives of the FRMPs) in all the UoM-level FRMPs assessed. For the Evros FRMP, these references are missing except in the information sheets per measure, chapter 8.3.

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

- The general objectives are not specific nor clearly measurable (though one FRMP refers to measuring them in terms of the outcomes of projects). As a result, it is unclear if the flood risk management goals set out in these objectives would be achieved if all measures will be implemented.
- The FRMPs do not explain the links between the more specific objectives of the Evros FRMP (EL1210) and the general objectives which are cited in the FRMP for Thrace, EL12, of which the Evros basin is a part.

4. Planned measures for the achievement of objectives

Greece reported 14 XMLs, one for each of the 14 UoMs. For all 14 UoMs, including the five UoMs whose FRMPs have been assessed, the total number of individual measures is 119, and the total number of aggregated measures is 263. In consequence, the grand total of measures is 382. (Please see Annex A for detailed tables and charts on measures related to the topics in this section.)

The FRMPs refer to two types of measures: "individual interventions" (reported as "individual measures")[36], and "bundle of interventions" (reported as "aggregated measures"). While the definitions of "individual" and "aggregated" measures are not given in the FRMPs themselves, the reporting sheets explain that a bundle of interventions is "a measure that includes different types of individual actions for its implementation or concerns different types of infrastructure".

The average number of measures per UoM is 27, with a range between 23 and 51 measures per UoM[37]. The Thrace FRMP, EL12, has significantly more measures than the others: for the other 13 UoMs, the number of measures ranges from 23 to 26; however, for Thrace (which includes two FRMPs, one for the UoM as a whole and one for the Evros sub-basin, EL1210), their number is 51. Similarly, the range of individual measures for 13 of the 14 UoMs is from 6 to 8, but for Thrace their number is 30.

The 14 FRMPs at UoM-level and the one FRMP for a specific sub-basin each contain most of the measure types[38] defined; however, M11[39] and M52[40] are not reported for any FRMP, while M21[41] and M22[42] are reported only in the FRMP for Thrace, EL12.

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[36] The FRMPs also state that some of the individual measures consist of "roof" measures leading to a number of specific interventions, e.g. measure codes EL_XX_31_15: "Development of a master plan for flood protection works" ("XX" in the measure coding here and elsewhere stands for the specific UoM for measures found in all UoM-level FRMPs).

[37] 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 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.

[38] See Annex B for the list of all measure aspects and measure types.

[39] M 11: No Action, no measure is proposed to reduce the flood risk in the APSFR or other defined area.

[40] M 52: 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).

[41] M 21: Prevention, Avoidance, Measure to prevent the location of new or additional receptors in flood prone areas, such as land use planning policies or regulation.

Across all 14 UoMs, protection measures make the largest share of the measures with 148 measures of the 382 in total (38.7%). These are followed by preparedness measures (94 measures, or 24.6%), prevention measures (92 measures, 24.0%), recovery and review measures (34 measures, 24.1 %) and other measures (14 measures, 0.1%, 9 of which cover all objectives).

The FRMPs[43] assessed also categorise the measures into the following types[44]:

- Legislative and administrative regulations: administrative regulation decisions;
- Economic measures: measures and interventions for the better determination of flood damage as well as financial tools for the management of flood impacts;
- Education / information measures: education, information and awareness actions;
- Non-structural interventions: regulations (e.g. land use control, zoning) and non-structural projects (such as early warning systems);
- Acquisition, completion and improvement of information: creation or completion of databases, completion of field data (mainly topographic surveys of infrastructures and elements of watercourses geometry);
- Measures of environmental nature (green infrastructure): measures and interventions for the protection of environmentally sensitive areas.
- Technical measures of flood protection: construction works regarding flood protection and studies for their implementation.

For each measure in the FRMPs[45], it is indicated to which of these types it belongs. No summary information is provided, however, regarding the number of measures under each type.

In addition to the measures planned for the implementation of the Floods Directive, the UoM-level FRMPs[46, 47] describe "actions that are implemented and contribute to the management of flood risk". The following categories are provided:

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[42] M 22: 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

[43] FRMPs, chapters 10.3; for the FRMP of the Evros sub-basin, chapter 8.3. Also found in the reporting sheets.

[44] In the reporting sheets and the FRMPs it is mentioned that the aim of this categorisation is better monitoring.

[45] In the summary information sheets in chapter 10.3 of the UoM-level FRMPs. No summary information is provided, however, so the number of measures for each type is not clear.

[46] Chapter 10.2. In the reporting sheets, a similar but partly different list of such actions is given, with notably the addition of spatial and urban planning: 1. spatial and urban planning, 2. disaster management (General Plan of Civil Protection "Xenocrates"), 3. Cleaning and maintenance of watercourses, 4. Delineation of watercourses,

1. General Plan of Civil Protection, the Xenocrates Plan
2. Cleaning and maintenance of watercourses/streams
3. Delineation of watercourses/streams
4. Definition of the seashore and the beach
5. Mechanism for the assessment of damages and compensation from floods
7. Insurance of agricultural production against flood damage.
8. Coding of tools and responsibilities of farmers
9. Actions for the rehabilitation of the functionality of drainage networks
10. Actions for the improvement/rehabilitation of upstream parts of river basins
11. Other actions (9 mentioned).

The FRMPs do not, however, detail the work carried out for each type of action. Nonetheless, the UoM-level FRMPs also mention[48], under actions for reaching the objectives of the FRMP, some of the actions in the list above, along with actions related to spatial and urban planning as well as the national adaptation plan to climate change.

While it is clear that flood management does not start with the FRMPs, the links between these previous and ongoing activities and the FRMP and its measures are not specified clearly. It is generally stated that these actions "have been taken into consideration" when developing the FRMPs and that the implementation of these actions will "surely be facilitated" by the now available Flood Hazard and Risk Maps. Yet, it is not further clarified what practical consequences the Floods Directive and the information and process for the development of the FRMPs will have for such actions (e.g. on a potential modification to the regulatory structure for urban and spatial planning) nor for their practical implementation. An example of a potentially relevant measure that could affect ongoing actions is related to the cleaning and maintenance of water courses: this measure is found in all FRMPs[49].

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5. definition of the seashore and the beach, 6. assessment of damages and compensation from floods, and 7. insurance of agricultural production against flood damage.

[47] In the Evros sub-basin FRMP, the list of additional actions is not found, but the same list in the previous footnote can be found in the reporting sheet for this FRMP as for the others.

[48] In chapter 12.1

[49] Certain methods for "cleaning" of water courses could lead to interventions in pristine river beds for the sake of possible flood protection effects; this can occur in upstream areas and protected river deltas. The setup for this type of action appears complex (e.g. the clarifications for flood protection in streams issued in October 2019), and these activities could sometimes be performed with reference to flood protection by the local or regional level, which however would warrant proper scrutiny by overseeing authorities. Therefore, this measure, "Codification of Legislation in matters of cleaning and maintenance of watercourses/streams - Preparation of a regulation of

4.1 Cost of measures

The FRMPs provide measure information sheets that include estimated costs for each measure (all measures except 5 out of the 382)[50]. An overview of the costs provided in the FRMPs is provided in Table 6 below. The range of costs per measure across all the FRMPs assessed is from zero (69 measures) to 12 measures with costs above EUR 5 Million.

Table 6 Overall budget for the measures in the assessed FRMP

UoM	Estimated overall budget of planned measures (for the initial investments) in million EUR
EL01	17.505[51]
EL02	28.365
EL03	22.585
EL04	15.255
EL05	17.060
EL06	104.420
EL07	26.935
EL08	14.475
EL09	19.168
EL10	51.700
EL11	35.805
EL12	17.925[52] + 4.405[53]
EL13	21.185
EL14	38.955
TOTAL	435.743

Source: FRMPs

The majority of costs are related to protection measures: for example, for the Western Peloponnese, EL01, their share of the overall costs is 74.8% (EUR 13.095 million[54]); for

required actions for restoration of drainage of stream beds, maintenance and management of riparian vegetation" (measure code EL_XX_44_23), could be – if done correctly and considering the practical implementation implications – valuable in terms of improving nature protection, achieving WFD goals and strengthening flood risk management.

[50] Chapter 10.3 of the UoM-level FRMPs and chapter 8.5 of the FRMP for the Evros sub-basin.

[51] This number for EL01 is found in the FRMP, chapters 10.4.2 (pp. 29869) and 12.2.1.4 (pp. 29906), representing the cumulative costs for the initial investment for all measures, no specific timeframe given.

[52] This number refers to the costs mentioned in the EL12 FRMP (pp. 32935) excluding the Evros sub-basin.

[53] This number refers to the specific Evros sub-basin (EL1210). The corresponding FRMP does not provide a summary number, yet it was extracted from the relevant reporting sheet that shows costs of measures per measures category (preparedness: 0.470; protection: 2.780, prevention: 1.015; recovery and review: 0.140).

[54] FRMP for EL01, pp. 29869.

Attica, EL06, it is 97.1% (EUR 101.445 million[55]); and for the Aegean Islands, EL14, it is 93.4% (EUR 36.395 million[56]). Of these protection measures, one measure for Epirus, EL06, for "Studies/Flood protection works" is estimated at EUR 95 million.

Greece also provided measure costs in its reporting sheets (see Annex A Table A 6 and Table A 7 for more information). For at least one UoM, however, the amounts in the reporting sheets are different from those in the FRMP[57].

In their reporting sheets, Member States could add explanations about the costs. The reporting sheets submitted by Greece contain measure-specific cost explanations for 101 measures. While the estimation of costs seems to be have been performed in the same overall way for all FRMPs, a variety of approaches and assumptions were reported for the cost estimations and cannot be summarised (approximately 50 different cost explanations were provided).

4.2 Funding of measures

Some general information on "funding tools" can be found in the UoM-wide FRMPs assessed[58], and the plans also show the funding source for most measures[59]. No overview is provided, however, regarding the level of financing per source for the PoMs. (No differences were seen across the five FRMPs at UoM-level assessed.) The FRMP for the Evros sub-basin, EL1210, does not provide information on funding.

Based on the information found in the five UoM-wide FRMPs assessed, Table 7 below identifies the funding sources.

Table 7 Funding of measures

	UoMs EL01, EL05, EL06, EL12, EL14
Distribution of costs among those groups affected by flooding	

[55] FRMP for EL06, pp.34815.

[56] FRMP for EL14, pp. 31235.

[57] In the reporting sheet for the Western Peloponnese, EL01, costs are given per measure category (preparedness, protection, prevention, recovery and review, other) and sum up to 24.6 Million Euro, so there seem to be inconsistencies between the FRMP, as shown in Table 4.1, and the reporting (only for EL01 have the numbers of the FRMP and reporting have been compared as an example). Moreover, by adding the individual costs of the EL01 measures as set out in the FRMP, the result is 21.2 Million Euro, again suggesting inconsistencies or an incomplete explanation. For all FRMPs, the numbers found in the FRMPs themselves are included in the table above.

[58] Chapter 12.2.1.4. This information is also found in the reporting sheets.

[59] Chapter 12.2.2.2, Table 12.9. The information sheets for each measure do not include a category for funding and do not provide additional detail on this topic.

	UoMs EL01, EL05, EL06, EL12, EL14
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

The reporting sheets provide information on the location of measures and their area of application.

Regarding the location of measures, in the UoM-level FRMPs[60] it is stated that the measures describe actions and regulations to address the flood risks in the APSFRs, and in particular in the geographical areas defined in the flood risk maps, for floods with an occurrence period of 100 years (scenario of average probability). Actions and regulations may be implemented also outside the APSFRs. It is furthermore stated that administrative measures and horizontal actions are implemented at the level of the UoM.

In addition, both the location and the area of application of the measures are indicated in the information sheets for each measure[61], describing specific locations and combinations of locations. No summary information is provided, so an aggregation is not possible.

The FRMPs and the reporting sheets moreover state that measures are taken to mitigate the effects of flood risk in APSFRs and in particular in the geographical areas defined in the Flood Risk Maps for floods with a return period of up to 100 years. They note, however, that at the same time, taking measures for areas outside the APSFRs is possible (as long as they do not contradict the general objectives), and a series of additional conditions for financing such measures is also provided[62].

[60] Chapter 10.3 of the UoM-level FRMPs. This information is not found in the Evros FRMP.

[61] Also found in chapter 10.3 of the UoM-level FRMPs. The information sheets are found in chapter 8.3 of the Evros sub-basin FRMP.

[62] See for example, in the FRMP for Epirus (EL01), pp. 29806-29807 and pp. 29817.

In the reporting sheets, the location was reported for each measure. Although different locations are indicated, with a total of 177 different responses, many measures have APSFR references (i.e., mentioning one or more APSFRs for which a specific measure is relevant). Overall, for an estimated 155 measures out of the 382 total (40% of the total), one or more specific APSFRs are cited. In addition, for an estimated 173 out of the 382 measures (45% of the total), the location is "whole UoM", with another 4 measures (1% of the total) being "whole country/UoM". For the remaining 50 measures (13%), it was not possible to organise the locations into categories.

Overall, the descriptions of the measures are at a general level and have to be further specified for their implementation. In the reporting sheets and in chapter 12.1. of the UoM-level FRMPs[63], "activities for reaching the objectives of the FRMP" are outlined, which mainly provide a general orientation regarding the specification and implementation of measures to be carried out. In the FRMPs assessed, it is unclear what exactly each measure tries to achieve and how, only the general content is provided.

This is confirmed by the following statement[64]: "The FRMP includes a Programme of Measures for the proper management of flood risks for all the axes of flood risk management (Prevention, Protection, Preparedness, Rehabilitation[65]). Therefore, the FRMPs do not constitute technical studies for the construction of projects, but tools for policy making and action planning by any agency involved in flood risk management. They contribute to a better understanding of flood risks and the identification of areas with a higher flood risk, using for the first time a unified methodology and scientific documentation at country level, in accordance with the requirements for the Floods Directive. They serve the competent services as a first tool for assessing the negative effects of floods in designing appropriate protection measures."

In sum, the measures are partly specific, as the FRMPs and reporting sheets provide information on their location and on their area of application. Information on what exactly each measure tries to achieve and how is not provided.

[63] Except for the Evros FRMP where this information is missing; in chapter 8.5 a summary description per group of measures is provided, including also to some extent elements for specification.

[64] Found in the reporting sheets for all UoMs; for the Evros FRMP, this statement is not found in the reporting sheet, but only in the FRMP itself (chapter 1.2, pp. 29482).

[65] The categorisation of measure types for reporting refers to "recovery and review" (see Annexes A and B below), while the Greek FRMPs refer to "rehabilitation".

4.4 Measures and objectives

The information provided in the reporting sheets indicates links between the measures and the objectives they address. Although a range of different information[66] is provided, it is possible to say that roughly the following number of measures are focussed on each general objective:

- 64 measures (17% of the total 382 measures) have been identified as related to "Mitigation of flood exposure" (Management Objective S1)
- 138 measures (36% of the total) are related to "Reduction of the likelihood of flooding" (Management Objective S2)
- 95 measures (25% of the total) are related to "Strengthening the preparedness for Flood Management" (Management Objective S3)
- 28 measures (7% of the total) are related to the "Improvement of the mechanisms for the rehabilitation of the affected areas" (Management Objective S4)
- The remaining 57 measures (15% of the total) appear to be related to more than one of the objectives.

The objectives set in the FRMPs are not specific (see section 3). In addition, it is only generally stated that the measures will contribute to reaching these objectives and the relevant objective to which a specific measure contributes to as stated in the information sheet of each measure.

Information explaining how much the measures will contribute to the objectives or whether the objectives will be achieved when the measures have been implemented was not found in the reporting sheets or the FRMPs assessed. In the analysis of cost-effectiveness of measures (see section 6 below), estimations are provided on the effects a measure has regarding the reduction of flood damage costs due to flooding, but this analysis is not linked to the objectives.

4.5 Geographic coverage/scale of measures

The reporting sheets provide information on both the geographic coverage of measures and their scale. As a broad range of different types of information has been reported[67], aggregation has not been possible; nonetheless, for many of the measures, both the geographic cover and the scale is at APFSR level. The FRMPs also provide this information[68], without summary information.

[66] In total, 84 different answers across the 382 measures were identified regarding objectives.

[67] Across the 382 measures, 141 different responses on geographic coverage were identified.

[68] Chapter 10.3 of the FRMPs and chapter 8.3 in the Evros FRMP.

4.6 Prioritisation of measures

In the reporting sheets, Greece indicated the category of priority for 179 out of the total of 382 measures.[69] The following categories are used:

- Critical: 10 measures (6% of the 179 measures whose priority is reported)
- Very high: 14 measures (8% of the 179)
- High: 141 measures (79% of the 179)
- Moderate: 14 measures (8% of the 179)

No measures were categorized as low priority.

The methods for prioritisation remain general: in the reporting sheets and the FRMPs[70], it is mentioned that all measures of the PoMs are important for tackling flood risk and can be implemented in parallel, but some may have a relative priority for their implementation. Areas characterised as very high and high risk are those that host large concentrations of population or significant economic activities as well as important cultural monuments: these areas, mainly urban centres and suburban areas, have priority. Also, priority is given to measures for areas where flooding can create significant environmental risks and damage. The FRMPs present an indicative list of measures that can be seen as priorities without ranking them.

In addition, in describing the results of the cost-effectiveness analysis[71], the UoM-level FRMPs assessed provide a ranking of the measures based on their cost-effectiveness ratios (high, medium or low): these FRMPs do not clarify if and how these results may affect the prioritisation of the measures. In the reporting sheets, it is mentioned that "this categorisation will be used for the implementation programming of the PoM", though here too it is not clear if it has affected the prioritisation of measures that has been reported.

For all but 2 of the 382 measures, a timetable has been provided in the reporting sheets. At the same time, the information includes either a qualitative scale (short, short-medium, medium and long term) or specific start and end dates (start 2018, end 2019, 2020 or 2021; start 2019, end 2020, 2021, or after 2021).

[69] Notably the prioritisation for all measures for some UoM (EL01 to 5, 8 and 13) is reported, and for no measures in the other UoMs.

[70] Chapter 12.1 of the UoM-level FRMPs. There, the "priorities" are defined only through the timetable for the implementation of measures.

[71] Chapters 10.4 (and in particular Table 10.9) of the UoM-level FRMPs. (For the Evros RBMP, no CEA of the measures was performed, see section 6 below).

Based on this, 72 measures (19% of the 382 for which a timetable has been provided) are long term or their completion is set for after 2021 (all of them are preparedness or protection measures). Another 42 measures (11% of the total) have a short-medium or medium-term timeline: these are from all measure aspects. All other measures (70% of the total) are indicated as either short or medium term or to be implemented by 2021. (See Annex A Table A 10 and Table A 11 for more information.)

Separately, the reporting sheets and the FRMPs assessed[72] indicate that two "timing" categories are established: 1. short-term measures with an implementation horizon until 2021, which have secured funding or their planning is sufficiently mature that they can implemented by 2021; and 2. medium-term with an implementation horizon after 2021. The second category includes measures whose preparatory actions will be completed by 2021 and whose full implementation will take place after 2021[73]. In the FRMPs, the information sheets for each measure indicate their timing; however, these reporting sheets use three categories rather than two: short, short/medium and medium.

Overall, based on the above, the information found on timing does not seem consistent, since varying categorisations regarding timing are found in the different sources.

4.7 Authorities responsible for implementation of measures

In the reporting sheets, Greece has reported the authorities responsible for each measure, with 139 different authorities or combinations of authorities mentioned. At the same time, the level of responsibility is reported also in a summary way:

- Central/staff services at national level (192 measures, 50% of all measures)
- Decentralised administration (73 measures, 19% of the total)
- Local government organisations (83 measures, 22% of the total) and
- other bodies (34 measures, 9%).

For most of the prevention measures (76 out of 92) and recovery and review measures (30 out of 34), the Central/staff services are responsible (the categories are not further explained, however).

[72] Reporting sheets and Chapter 12.2 of the UoM-level FRMPs

[73] For the Evros FRMP, however, three categories were used: a. Short term (implementation within a year of the FRMP's adoption); b. Medium term (up to 2021); c. Long term (beyond the 6-year cycle of the FRMP). See reporting sheet for this sub-basin and the Evros FRMP, chapter 8.2, pp. 29544. This categorisation of timing was then used in the information sheets for each measure in chapter 8.3 of the FRMP.

In the FRMPs assessed, the information sheets for each measure indicate the "implementing institution", which for a number of measures are numerous, without an indication of the main responsible institution. At the same time, a distinction between the "main implementing institution" and "other involved institutions" for each measure can be found[74] in a summary table. It is stated there that for most measures, the highest administrative level of the implementing institution is indicated in order to facilitate the control and monitoring of the implementation of measures.

4.8 Progress of implementation of measures

In the reporting sheets, the progress of implementation is reported for all measures, with 318 measures not started (83% of the total), 28 measures as "progress ongoing" (7%) and 36 measures as "ongoing construction" (9%).

In addition, a description of progress (an optional category) was reported for 231 measures: for 190 measures (50% of the total 382 measures), "Implementing agencies have been appointed". Another 27 measures (7% of the total) were reported as "Implementation agencies have been appointed and the measure is in progress". (A range of other descriptions was provided for the remaining 165 measures.)

In the FRMPs assessed, the information sheets for each measure include a category for the implementation phase, with the options of "proposed", "in development", "under construction" and "completed"; summary information of the implementation status for the measures is not provided in the FRMPs, however.

4.9 Measures taken under other Community Acts

Member States could report on other Community Acts under which each measure has been implemented: Greece did not provide this information in the reporting sheets.

In the UoM-level FRMPs assessed, 16 related EU Directives and policy initiatives are listed[75], but without any detail about their relevance nor any description of the linkages between individual Directives and the measures. For further information on linkages with the Water Framework Directive (WFD), however, please see section 4.13 below.

[74] Chapter 12.1, table 12.1, of the UoM-level FRMPs. This information is missing in the Evros FRMPs.

[75] Chapter 2.4 of the UoM-level FRMPs. This information is not found in the Evros FRMP.

4.10 Specific groups of measures

One measure related to *spatial planning and land use* has been identified in the reporting sheets for all 14 UoM-level FRMPs and in the UoM-level FRMPs assessed[76]: "Land use management measures in the drainage areas of streams"[77]. These measures include promoting and financing land use "best management practices" for forest management, livestock and agricultural activities upstream of APSFRs.

Two additional relevant measures (both from the FRMP for the Evros sub-basin) have been identified, these are:

- "Restructuring of crops within the flood zone"[78]
- "Relocation of activities and facilities outside the flood zone"[79].

In addition to the measures planned for the implementation of the Floods Directive and as part of "actions that are implemented today and contribute to the management of flood risk", the UoM-level FRMPs assessed[80] describe existing actions related to spatial and urban planning. While a full overview of the changes in the framework of halting or controlling buildings or development-in floodplains since 2000 is not provided, these FRMPs mention that flood risk has been one of the parameters considered in spatial and urban planning and in related studies. The FRMPs state that the information and orientation they now provide will be considered in addition to other parameters so that specific measures regarding urban and spatial planning will be proposed, tailored to the general and specific situation of every area. In this way, spatial and urban planning defining the land use and the building regulations will contribute substantially to reaching the general objective for the "mitigation of flood exposure", with a priority to areas flooded under a 100-year recurrence. It is pointed out that Greece's new building regulation (from 2012) reduces the maximum share of area that can be built on plots (as set out in building permits), thus increasing the share of unbuilt land, which in combination with building requirements is stated to be promoting natural water retention and thus the reduction of runoff. The FRMPs assessed also state that the systematic application of these measures will contribute to the objective of reducing the likelihood of flooding.

[76] Not found in the Evros FRMP.

[77] Measure number EL_XX_35_17 (measure type M35).

[78] Measure number EL12-21-001 (measure type M21). Evros FRMP, pp. 29560.

[79] Measure number EL12-22-001 (measure type M22). Evros FRMP, pp. 29564.

[80] Chapter 12.1 of the UoM-level FRMPs assessed. Not found in the Evros FRMP.

Two measures found in all 14 UoM-level FRMPs[81] refer to *Natural Water Retention Measures* (NWRM), along with other elements, however the application of nature-based solutions does not appear widespread:

- "Promoting practices of withholding flood flows and sediments/debris, with a focus on Natural Water Retention Measures"[82]. This measure refers to the development of studies for areas upstream of APSFRs and describes, in a general way, options that can be included to reach the objective of this measure, including NWRM (e.g. construction of dry retention ponds).
- "Preparation of a new regulation for rainwater runoff and flood protection works"[83]: the FRMPs explain that, since the current technical regulations for such projects date to the 1970s, a revision is needed; this will consider newer developments and – inter alia – technical solutions for natural water retention.

In the Evros FRMP, the following measure is included[84]: "Pilot project for the development of retention areas for floods in the Erithropotamos river (natural water retention)": This includes the investigation, technical study and implementation of such retention areas for this specific river (linked to one APSFR).

The FRMPs assessed do not, however, mention whether *nature protection* has been considered generally for the development of measures. In the national categorisation of measures into seven types (see above at the beginning of section 4), one category includes measures potentially related to nature protection: measures and interventions for the protection of environmentally sensitive areas. Under this category, the following measure is found in all 14 FRMPs at UoM-level[85]: "Land use management measures in the drainage areas of streams".

The Evros FRMP[86] contains the following nature protection measure: "Assessment of the effects of floods on the Evros Delta national park" (with the aim to restore the natural flood regime in the protected areas of the Delta).

There is no information provided regarding the consideration of *ports and navigation* in the development of the measures or in specific measures.

[81] But not in the Evros FRMP.

[82] Measure number EL_XX_31_08 (measure type M31). This is the only measure reported under measure type M31.

[83] Measure number EL_XX_35_14 (measure type M35).

[84] Measure number EL12-33-006 (measure type M33): Evros FRMP, pp. 29569.

[85] Measure number EL_XX_35_17 (measure type M35): Chapter 12.2.2.2 of the UoM-level FRMPs

[86] Measure number EL12-35-001 (measures type M35): Evros FRMP, pp. 29566.

The *dredging* of rivers to increase river channel capacity and the ability to convey water for flood alleviation purposes, as well as bank modifications and river bed modifications, are planned as part of a number of protection measures in all 14 FRMPs at UoM-level. The most important such measures appear to be:

- "Development of a master plan for flood protection works"[87];
- "Studies/construction of flood protection works"[88].

This second measure is important since it is budgeted at approximately EUR 225 million for all 14 UoMs together and will lead to the construction of flood protection works. This measure represents about 68% of the total budget planned for all measures across the 14 UoMs. Its description does not clarify if flood protection works will be developed in a way to minimize impacts on the hydromorphological characteristics of the stream and rivers or on their environmental condition[89]. The description of the measure refers, however, to for example increasing the water volume capacity of streams and "protecting" the river bed (by "coating" of river bed and slopes, thus heavily impacting vegetation and hydromorphological characteristics) and flow regulation.

4.11 Recovery from and resilience to flooding

Regarding insurance policies, the six FRMPs assessed mention, among the "actions that are implemented today and contribute to the management of flood risk"[90], existing "insurance of agricultural production against flood damage", and they describe its operation. This insurance is mandatory for agricultural activities (except for pork and poultry raising, flower cultivation and plant nurseries), and it covers 88% of the costs flood damage above the first 15% of costs (but insurance reimbursements are provided only if the damage is above 20% of the overall value). The FRMPs assessed do not, however, discuss how this insurance scheme contributes to the implementation of the Floods Directive, nor do they refer to insurance schemes for other activities.

[87] Measure number EL_XX_35_15 (measure type M35)

[88] Measure number EL_XX_33_12 (measure type M33). For the information sheet of this and the previous measure, see for example the FRMP for Western Peloponnese, EL01, pp. 29838-9 or EL06, pp.34782-3.

[89] The measure descriptions do not mention consideration of other environmental legislation such as the "no deterioration" clause of the WFD or the requirements of Art. 4.7 of the WFD regarding modifications that affect water body status (this article is not mentioned in the FRMPs).

[90] That is, separate from the measures planned for the implementation of the Floods Directive. Chapter 10.2 of the UoM-level FRMPs.

Beyond that, one specific measure (included in all 14 FRMPs[91]) briefly mentions insurance: "Campaigns for awareness raising of the public, local authorities and communities regarding flood risk"[92]. In the measure description it is stated that the awareness raising activities should include information on the usefulness of insurance for properties that are in potentially flooded areas (e.g. of 50-year reoccurrence).

No information was found, however, in the FRMPs or reporting sheets on new insurance measures for potential flooding areas as part of the implementation of the Floods Directive. Moreover, no details are provided regarding flood risk insurance (and no information on making insurance conditional on improving flood resilience of properties at risk) beyond that regarding agriculture.

4.12 Monitoring progress in implementing the FRMPs

Progress monitoring takes place at two levels, according to the reporting sheets:

1. At national level, monitoring by the Special Secretariat for Water of the Ministry of Environment: this relates to measures implemented by national ministries and authorities belonging to them, including regulations and actions implemented at national level and measures that are targeted at solving local problems but are implemented from the central administration and financed by sectoral financing programmes or ministerial budgets.
2. At regional level, monitoring by the Water Directorates of the relevant decentralised administration for all other measures.

The progress of implementation of measures has to be presented in annual reports from regional water authorities to the Special Secretariat for Water, as well as in annual national reports (for the previous year, based on the regional reports) from the Central Water Agency to the National Water Council, as required by national legislation.

The FRMPs assessed[93] provide more detail regarding the set-up and structure of the planned monitoring process. This will be based on the seven national types of measures (see initial pages of this section). Preparatory actions for setting up the monitoring system are also described. The FRMPs also provide ten potential main indicators for progress monitoring. These indicators are:

[91] But not in the Evros FRMP.

[92] Measure number EL_XX_24_07 (measure type M24).

[93] In the UoM-level FRMPs, chapter 12.2.3 regarding the structure of the monitoring system. In the Evros FRMP, there is a brief and more general description of the planned monitoring system in chapter 8.4.

- Indicator 1 and indicator 2: number of measures completed and number in progress, respectively;
- Indicator 3 and indicator 4: number of studies completed and number in progress, respectively;
- Indicator 5 and indicator 6: number of works completed and number in progress, respectively;
- Indicator 7 and indicator 8: number of other activities completed and number in progress, respectively;
- Indicator 9 and indicator 10: Overall budget ensured for the implementation of measures and overall budget spent (from European funds, national funds and own funds), respectively.

The FRMPs assessed do not specify the baseline against which progress will be monitored and assessed.

A specific measure is found in all the 14 UoM-level FRMPs for the "Development of a Monitoring System for the PoMs of the Flood Risk Management Plan"[94].

4.13 Coordination with the Water Framework Directive

Table 8 shows how the development of the FRMP has been coordinated with the development of the second River Basin Management Plan of the WFD.

Table 8 Coordination of the development of the FRMP with the development of the second River Basin Management Plan of the WFD

	For all FRMPs assessed: EL01, EL05, EL06, EL12, EL14
Integration of FRMP and RBMP into a single plan	
Joint consultation of draft FRMP and RBMP	✓ (one common event per UoM)
Coordination between authorities responsible for developing FRMP and RBMP	✓
Coordination with the environmental objectives in Art. 4 of the WFD	✓ (WFD objectives are reported as "considered", but details are not provided)
The objectives of the Floods Directive were considered in the preparation of the RBMPs	✓ (RBMP measures for reservoir management consider FRMP

[94] Measure number EL_XX_61_01

	For all FRMPs assessed: EL01, EL05, EL06, EL12, EL14
	objectives)
Planning of win-win and no-regret measures in the FRMPs	✓
The RBMP's PoMs include win-win measures in terms of achieving the objectives of the WFD and Floods Directive, drought management and NWRMs	✓ (partly for the Floods Directive)
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	(see section 4.13 above)
Consistent and compliant application of WFD Article 4.7 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	
The use of sustainable drainage systems, such as the construction of wetland and porous pavements, have been considered to reduce urban flooding and also to contribute to the achievement of WFD Environmental Objectives	

Overall, no common measures haven been taken for the implementation of both Directives. However, some coordination between the measures of the two Directives is reported, mostly through establishing the relationships among the measures of the two PoMs (see below for more details). As summarised in the reporting sheets[95], the coordination took place through:

1. Consideration of all information from the implementation of the WFD in the development of FHRMs;
2. When assessing the flood risk, the effects on protected areas under the WFD were taken into account;
3. When developing the measures for the FRMP, objectives of the second cycle RBMPs were taken into account, and measures are proposed that contribute to reaching them;
4. Existing RBMP measures were broadened to address also flood risk management aims (for example, the measure for using existing reservoirs also supports flood management)[96];

[95] More details including the results of these coordination activities are provided in the UoM-level FRMPs, Chapter 10.5 (for the Evros FRMP: Chapter 10).

[96] No list of such "broadened" measures is provided to explain which measures are modified and how.

5. A common consultation event for each UoM took place for the first cycle FRMP and the second cycle RBMP;
6. In the context of the Strategic Environmental Assessments (SEAs) for the FRMPs, potential negative effects on the environment were checked: these considered the requirements of the WFD;
7. The implementation of both the RBMP and the FRMP are coordinated at central level by the Special Secretariat for Water and at regional level by the Water Directorates, ensuring the complementarity of actions.

The FRMPs assessed[97] describe in further detail the actions taken for coordination of actions regarding the Floods Directive and the WFD, including:

- the identification of measures of the second cycle RBMP that are directly linked to the FRMP;
- measures of the second cycle RBMP that affect the measures planned for the FRMP, indicating to which flood measures they are related;
- measures of the FRMP that reinforce or supplement the implementation of the second cycle RBMP and related measures.

Finally, a working group for the coordination and operational support of the implementation for both Directives at local and regional level has been established. This group also has the objective to exchange information, expert knowledge and good practices between the different authorities involved in the implementation of the PoMs of both Directives (no further details provided)[98].

In the FRMPs assessed, the information sheet for each measure contains a category for the relation to the objectives and measures of the RBMP; for most measures, however, this category is not filled in or just mentions related measures of the Programme of Measures of the RBMP.

This information has been used for filling in Table 8 above. Overall, there seems to have been some coordination, mainly by setting in relation the measures under both Directives. However, specific coordination on important aspects is missing. For example, the FRMPs and the reporting sheets suggest that there has been:

- no detailed coordination with the environmental objectives of the WFD (especially regarding significant adverse environmental impacts that may be caused by the

[97] Chapter 10, Tables 10.13 and 10.14 of the UoM-level FRMPs assessed.

[98] Reporting sheets.

implementation of the FRMP in order to identify remedial actions/change the measure planning);
- no consideration of the WFD requirements regarding FRMP measures that may negatively affect water body status (Art. 4.7 of the WFD).

The FRMPs do, however, state that Art. 4.7 of the WFD will be considered when implementing specific works, thus presumably after the planning period, and moreover that a methodology for assessment has been developed.

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

The following **good practices** were identified:

- For each measure, the FRMPs provide an information sheet containing key information (including an estimation of costs per measure); even if not fully detailed, these information sheets will support the further specification of the measures as well as the monitoring of their implementation;
- Greece has set out plans for the development of a monitoring system for implementation progress, even if these are not fully specified in the FRMPs (a baseline is not specified and indicators were proposed but not yet agreed).

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

- The linkages between the measures for Thrace, EL12, and those for its Evros sub-basin are not specified; it is not clear why this UoM has two FRMPs with approximately double the number of measures planned as compared to all other UoMs.
- Although beneficial for continuity of management, the FRMPs do not explain how already implemented actions contributing to flood risk management (i.e. in place before the plans) are coordinated with and linked to the objectives and measures of the FRMPs.
- The measures are only partly specific and measurable: information on what exactly each measure tries to achieve and how is not provided, nor are results in terms of their potential contribution to reaching the objectives.
- The process of selection and prioritisation of measures is not clearly described. In addition, the information reported to WISE regarding prioritisation is not included in the FRMPs, while the link between the cost-effectiveness ranking of measures and their overall prioritisation in the FRMP is not explained.
- The timeline for the implementation of measures is not fully clear, and this can hinder monitoring of their implementation progress.

- Co ordination with the WFD has been limited, with main efforts focusing on the relation between measures of the FRMPs and RBMPs.
- Only very limited and general consideration is given to measures regarding land use and spatial planning for flood management, and there is no reference to halting or controlling development in floodplains that could increase flood risks.
- Although two measures can promote NWRM, the information provided is not detailed and the FRMPs do not highlight the potential role of NWRM or NBS in general.
- A high share of total costs will go for measures that could include river bank and river bed modifications, with possible negatively impacts inter alia on the ecological and hydromorphological conditions of streams and rivers; although the FRMPs refer to Art. 4.7 of the WFD, they do not provide information on how it will be implemented.

5. Consideration of climate change

In all the UoM-level FRMPs, chapter 3.4 presents a general introduction to the issue of climate change and the Greek policy response. Specific links to climate change are mentioned in chapter 7.1.6 (in the context of the development of the flood hazard maps); in the information sheets per measure in chapter 10.3 (regarding the effectiveness of the measures in the climate change context and their linkages to the national climate change adaptation strategy); and in chapter 12.1 (actions for reaching the objectives of the FRMPs, and how the climate adaptation strategy is to be considered in the revision of the FRMPs). For the Evros FRMP, climate change is addressed in the information sheets for measures found in chapter 8.3[99].

The FRMPs explain that in preparing Flood Hazard Maps, the impact of climate change was approached as follows[100]:

1. Extreme flood events due to climate change were examined in the low probability scenario. A return period T=1000 years was selected, which corresponds to particularly extreme conditions[101].
2. For large rivers, unfavourable flood conditions that may correspond to climate change conditions were additionally examined. For each flood scenario (in addition to average flood hydrographs), adverse flood hydrographs corresponding to the upper confidence limit of the rainfall curve and to reasonable unfavourable values of the hydrograph calculation parameters (such as relatively high Cn coefficient values and relatively low concentration time values) were constructed.

Additionally, for the assessment of climate change effects, trend testing was applied to the rainfall time series. In general, an increasing trend in rainfall time series was not found[102]. This analysis is further detailed in a specific report for each UoM entitled: "Study of the effects of climate change in the assessment and management of flood risk", not submitted as part of the

[99] The other mentions of links to climate change (regarding the development of FHM and the effects of the CC adaptation strategy on the revision of the FRMP) are not found in the Evros FRMP.

[100] EL Assessment of Flood Hazard and Flood Risk Maps, pp. 17; information also found in the FRMPs, chapter 7.1.6 and in the reporting sheets. Point 2 of this analysis was not reported in the Evros sub-basin FRMP.

[101] For the development of measures in the FRMPs the scenario of return period T=100 was mainly considered and targeted.

[102] It appears that this trend testing concerned annual rainfall, not trends on the historical development of extreme events.

FRMP reporting[103]. It is stated that further analysis will be done in the second implementation cycle of the Flood Directive.

Regarding measures, the FRMPs do not refer to specific measures to mitigate the expected effects of climate change on the likelihood and potential adverse consequences of flooding.

At the same time, the FRMPs assessed report[104] that in 2016 the National Climate Change Adaptation Strategy was established (the Strategy is based on a study which analysed 6 climatic parameters for the period 2021-2050 and 2071-2100). The national Strategy is to be followed by the establishment of regional plans for adaptation to climate change, which will – based on climatic conditions – establish specific policies and priority geographic units for taking measures, the specification of these measures, the funding sources for the implementation of these measures as well as the implementation authorities. The results of these regional adaptation plans will be considered in the first revision of the FRMPs. The UoM-level FRMPs assessed state that their four general objectives are compatible with the National Adaptation Strategy and will contribute to the reduction of climate change effects.

For each measure, the information sheet in the FRMPs indicates its effectiveness in the climate change context and its linkage to the National Climate Change Adaptation Strategy. This is presented in two categories, high or medium, depending on the nature of the measure. Effectiveness and linkage are indicated as high for: non-structural interventions; education and information measures; technical measures for flood protection; acquisition, completion and improvement of information; legislative and administrative regulations; and measures of an environmental nature. The following measures are reported to be of medium effectiveness and linkage: acquisition, completion and improvement of information; non-structural interventions; legislative and administrative regulations; and economic measures.

Finally, the reporting sheets state[105] that in the FRMPs, the following conditions, constraints and directions related to climate change have been incorporated as a result of the consultation:

- During the environmental permitting of works that will result from the implementation of the FRMP measures, the effects of these works on the vulnerability and adaptation

[103] These reports can be downloaded for each UoM at:
https://floods.ypeka.gr/index.php?option=com_content&view=category&id=11&Itemid=507
A study for a specific study for Evros sub-basin within the Thrace UoM, EL12, is not available.

[104] FRMP, chapter 12.1 (and also more generally chapter 3.4, where activities implemented in the context of the national adaptation strategy are described), reporting sheets; for the Evros sub-basin FRMP, this information is only found in the reporting sheet.

[105] The reporting sheets for UoMs (not for the Evros sub-basin FRMP).

potential in regard to climate change needs to be assessed. In addition, the vulnerability to climate change of the measures themselves needs to be assessed, and – where needed – appropriate measures to reduce vulnerability and increase the adaptation potential need to be proposed;

- During the revision of the FRMPs, climate change needs to be further integrated in accordance with the provisions of the forthcoming regional climate change adaptation plans, taking into account all potential changes in the catchment area and the coastal zone that might affect the flooding phenomena.

Despite these elements, the FRMPs assessed do not set out potential climate change impacts, such as possible shifts in the magnitude or frequency of extreme events. Also, the FRMPs do not discuss whether the main sources of flooding may change under long-term climate change scenarios.

5.1 Specific measures planned to address climate change

As describe above, the reporting sheets the FRMPs indicate that climate change was considered (and will be addressed further in the second cycle of FRMPs) but they do not identify specific measures planned for mitigating climate change impacts.

5.2 Good practices and areas for further development concerning climate change

The following **good practice** was identified:

- Climate change and its potential effects were considered in several aspects of the FRMPs, the National Climate Change Adaptation Strategy was considered and the plans indicate that the permitting of measures will consider possible climate impacts.

6. Cost-benefit analysis

The reporting sheets state that, for all UoMs[106], a cost-effectiveness analysis (CEA) of all measures selected, across all measure types, was conducted. The CEA was only carried out for already selected measures. This method provides a ranking of the measures into three categories based on their cost-effectiveness ratio (high, medium and low)[107].

The reporting sheets and the UoM-level FRMPs assessed[108] provide information regarding the CEA methodology applied: the benefit from the implementation of a measure corresponds to the flood damages that it eliminates. The assessment of the benefits from the implementation of each measure was specifically based on the following indicators:

1. Impact of the measure on the treatment of damage.
2. Importance assigned to the measure aspect (with prevention measures given a score of 0.4, protection measures a score of 0.3, preparedness measures, 0.2, and rehabilitation, 0.1).
3. Importance of the measure's features, depending on: a) whether the measure meets the objectives of other Directives (in particular the WFD), thus to a certain extent considering also multi-benefits; b) if it is based on natural flood management; c) if it does not have negative impact on other sectors or activities (no-regrets measures); d) if it is adaptable and scalable; e) if it protects activities particularly sensitive for flood risk (such as sensitive social infrastructure or polluting facilities).
4. Correlation of the measure with the objectives and actions of the National Strategy for Climate Change.
5. Implementability of the measure: the possibility of effective implementation of the measure is assessed, as some measures may face social opposition or other difficulties in their implementation, for example of an institutional or administrative nature.
6. Time for the measure to yield effects
7. Social discount rate
8. Benefit discount ratio (a function of the effective time scale of the measure and the social discount rate). In this way the economic effectiveness of the measures was calculated, as the ratio of the benefits to the cost of each measure.

[106] Except for the Evros RBMP, for which no CEA of the measures was performed, see the reporting sheet.

[107] The results are presented in Table 10.9 of Chapter 10.4 of each UoM-level FRMP assessed.

[108] Chapter 10.4 of the UoM-level FRMPs.

In the FRMPs assessed, it is not clarified if and how these results affected the prioritisation of the measures. The reporting sheets mention that "this categorisation will be used for the implementation programming of the PoM".

At the same time, it should be noted that the CEA was only carried out for those measures already selected, not for a longer list of potential measures.

In addition, the reporting sheets state that a CBA was not conducted for measures with transnational effects. While most UoMs are not transboundary, the following explanations are provided for the two transboundary UoMs:

- For the Epirus UoM, EL05, APSFRs of transboundary character have not been identified;
- For the Thrace UoM, EL12 (not including the Evros sub-basin, EL1210), the UoM-level FRMP covers the downstream part of transboundary catchments and so no measures are planned with effects in neighbouring countries;
- For the Evros sub-basin (EL1210), no analysis of costs and benefits was done, without further explanation given (the FRMP furthermore does not indicate whether a screening was carried out to identify possible measures with transboundary effects).

6.1 Good practices and areas for further development

The following **good practices** were identified:

- A cost-effectiveness assessment (CEA) was conducted for the measures selected.

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

- The CEA conducted concerned only already selected measures: it was not used to make selections of measures from a list of possible measures. The FRMPs report that the subsequent ranking of the measures was considered in their prioritisation, but it is not clarified how this was done.
- The Evros FRMP does not indicate if a screening was carried out to identify possible measures with transboundary effects (in any case, no CBA was conducted for such measures for this or other FRMPs).

7. Governance including administrative arrangements, public information and consultation

7.1 Competent authorities

No information was reported on any updates to the Competent Authorities and/or the Units of Management identified for the Flood Directive since 2011[109].

7.2 Public information and consultation

Overall, the steps taken for public information and consultation have been the same for all UoM; these were:[110]

- Establishment of the consultation programme, describing the main rules of the consultation, the organisation of the consultation process and the supporting tools and work programme for the consultation. This programme was established for each UoM[111];
- Uploading the draft maps and FRMPs; production of printed and electronic materials for publication and information, also communication by email or fax to all institutions involved;
- Enabling written comments and proposals through the common national website, https://floods.ypeka.gr/;
- Organisation of information events with stakeholders to provide detail on specific issues in the FRMP;
- Presentation and discussion of the draft FRMPs in public meetings where materials were distributed in printed format. The discussions that took place were recorded and the information was considered in order to finalise the FRMPs.

[109] The competent authority for the implementation of the Floods Directive in Greece is the Special Secretariat for Water of the Ministry of Environment. Chapters 2.2. and 2.3 of the UoM-level FRMPs (and chapters 1.2 and 1.3 of the Evros FRMP) show more details on other responsible and involved authorities. Chapter 2.3 of the FRMPs also present the legal and institutional framework for flood protection in Greece and the relevant authorities. This list of relevant laws and regulations consists of 127 documents. In addition, the institutions involved in each "step" of prevention, preparedness and other elements of flood management (which, based on a document of the Civil Protection Agency, consist of 35 steps) vary, with up to about 10 authorities involved in each step.

[110] According to the reporting sheets; additional detail is available in the UoM-level FRMPs, Chapters 11.2 and 11.3. For the Evros FRMP, the relevant chapters are 9.2 to 9.4: the consultation and stakeholder involvement process seems very similar for this sub-basin, but it is described in different wording.

[111] The programmes were not reported to WISE but are available for each UoM (though not for the Evros FRMP) at: https://floods.ypeka.gr/index.php?option=com_content&view=article&id=19&Itemid=506

As noted in section 4.13, joint consultation events were held with the Water Directorates at regional level for the development of the second cycle RBMPs and the first cycle FRMPs to ensure consistency between the measures for these plans.

After the completion of the consultations, a report was produced for each UoM[112] that summarises the entire process, including participant lists and summaries of every event as well as a record of all comments received and the responses to them, indicating their integration or not in the final plan.

Table 9 below shows how the public and interested parties in the five UoMs assessed were informed about 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 9 Methods used to inform the public and interested parties of the FRMP

	UoMs EL01, 5, 6, 12, 14
Media (papers, TV, radio)	
Internet	✓
Digital social networking	
Printed material	✓
Direct mailing	✓
Invitations to stakeholders	✓
Local Authorities	✓
Meetings	✓
Other (please specify)	

Source: FRMPs and information sheets

Table 10 below shows how the actual **consultation** was carried out:

Table 10 Methods used for the actual consultation

	UoM s EL01, 5, 6, 12, 14
Via Internet	✓
Via digital social networking	
Direct invitation	✓
Exhibitions	
Workshops, seminars or conferences	✓
Telephone surveys	
Direct involvement in drafting FRMP	

[112] Not officially submitted but available at:
https://floods.ypeka.gr/index.php?option=com_content&view=article&id=19&Itemid=506
A separate report was not provided for the Evros FRMP.

	UoM s EL01, 5, 6, 12, 14
Other: questionnaires	✓

Source: FRMPs and information sheets

Table 11 below shows how the **documents** for the consultation were provided:

Table 11 Methods used to provide the documents for the consultation

	UoMs EL01, 5, 6, 12, 14
Downloadable	✓
Direct mailing (e-mail)	✓
Direct mailing (post)	
Paper copies distributed at exhibitions	
Paper copies available in municipal buildings (town hall, library etc.)	
Other: Paper copies available at workshops and conferences	✓

Source: FRMPs and information sheets

7.3 Active involvement of Stakeholders

The steps taken for the active involvement of stakeholders are the same for all UoM; these were:[113]

1. Organisation of a common event for the first revisions of the RBMPs and the FRMPs with the Water Directorates at regional level, which are responsible for monitoring or measures implementation at local level, in order to ensure congruence of the two PoMs;
2. Working meetings with the relevant departments of the national ministries that have co-responsibility for administrative acts that are needed for the implementation of measures or that are fully responsible for the implementation of certain measures in order to finalise the PoMs of the FRMPs.
3. Written exchange (through written comments, emails) with the Water Departments at regional level during the entire process of the development and finalisation of the PoMs.

At the beginning of the consultation process, a list of the relevant stakeholders was developed for each UoM[114]. For example, the list for Western Peloponnese, EL01, contained 398 relevant

[113] According to the reporting sheets and additional detail in the UoM-level FRMPs, Chapters 11.2 and 11.3 (for the Evros FRMP, the relevant chapters are 9.2 to 9.4 – as noted above, the consultation and participation process seems very similar for this sub-basin, but it is described in different wording).

[114] As noted above, these are available (except for the Evros FRMP) at: https://floods.ypeka.gr/index.php?option=com_content&view=article&id=19&Itemid=506

stakeholders, while for Epirus, EL05, there were 650. Only a small number of these stakeholders were actively involved in the development of the FRMPs, however. Table 12 below shows the groups of stakeholders that were actively involved in the development of the five UoM-level FRMPs assessed, based on a screening of these stakeholder lists:

Table 12 Groups of stakeholders actively involved in the development of the FRMPs of the 5 UoMs assessed

	UoMs EL01, 5, 6, 12, 14
Civil Protection Authorities such as Government Departments responsible for emergency planning and coordination of response actions	✓
Flood Warning / Defence Authorities	✓
Drainage Authorities	
Emergency services	
Water supply and sanitation	
Agriculture / farmers	
Energy / hydropower	
Navigation / ports	
Fisheries / aquaculture	
Private business (Industry, Commerce, Services)	
NGO's including nature protection, social issues (e.g. children, housing)	
Consumer Groups	
Local / Regional authorities	✓
Academia / Research Institutions	
Other: relevant national ministries	✓

Source: FRMPs and information sheets

Table 13 below shows the **mechanisms** used to ensure the active involvement of stakeholders:

Table 13 Mechanisms used to ensure the active involvement of stakeholders

	UoMs EL01, 5, 6, 12, 14
Regular exhibitions	
Establishment of advisory groups	
Involvement in drafting	
Workshops and technical meetings	✓
Formation of alliances	

Source: FRMPs and information sheets

7.4 Effects of consultation

A summary description of the changes, adjustments and additions to the draft FRMPs as a result of the consultation process is not included in the UoM-level FRMPs[115]. Greece's reporting sheets[116] provide an overview of the changes resulting from the consultation. The changes described are the same for all UoMs and have been used to complete the table below. (As noted above, a document for each UoM-level FRMP is available at the national website for the FRMPs[117] and it is mentioned in the FRMP: these documents show the content and results of the consultation in more detail, including a response to each comment made during the consultation process.)

Table 14 Effects of consultation

	UoMs EL01, 5, 6, 12, 14
UoM / APSFR / other flood risk area code	
Changes to selection of measures	✓
Adjustment to specific measures	✓
Addition of new information	✓
Changes to the methodology used	
Commitment to further research	
Commitment to action in the next FRMP cycle	✓
Other: Specification of cost of measures; prioritisation of implementation	✓

7.5 Strategic Environmental Assessment

All the FRMPs (including the Evros FRMP) have undergone an SEA procedure[118]. The draft SEAs and the draft FRMPs were discussed together in the public consultation process[119].

[115] Based on Chapter 11.3.3 of the UoM-level FRMPs. The FRMP for the Evros sub-basin, EL1210 (in chapter 9.4) presents a general overview of the results of the consultation but not specific changes made to the FRMP.

[116] For the Evros FRMP, the description in the reporting sheet is more general and mentions only a revision of the measures based on the comments from the consultation as well as that the necessary changes were made.

[117] Available at: https://floods.ypeka.gr/index.php?option=com_content&view=article&id=19&Itemid=506 This website does not, however, contain a summary for the Evros sub-basin FRMP.

[118] Reporting sheets. Chapter 3.3 of the UoM-level FRMPs provide more information on the requirements for the SEA and their main contents and outcomes (this information is, however, not found in the Evros FRMP).

[119] See chapter 11.3.1. In addition, chapter 11.4 (chapter 9.5 of the Evros FRMP) provides more detail regarding the consultation process of the SEAs and its results. Additional details regarding this consultation can be found in the

The FRMPs provide a link to the national FRMP website for the draft SEA reports as presented for public consultation[120], but neither the draft for public consultation nor the final SEA reports were found at this website.[121] Although the FRMPs and Greece's reporting do not provide further information, since the SEA reports were approved together with the FRMPs, it can be assumed that they are also published in the Government Gazette.

7.6 Good practices and areas for further development regarding Governance

The following **good practices** were identified:

- Joint events were held with the Water Directorates at regional level for the development of the second cycle RBMPs and the first cycle FRMPs to ensure consistency between the measures for these plans.
- A report for each UoM summarises the consultation process, including participant lists and summaries of every event as well as a record of all comments received and the responses to them.

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

- The legal and regulatory framework regarding flood protection in Greece is overly complex.
- Only limited active involvement of stakeholders in the development of the FRMP has taken place.
- The FRMPs do not specify or summarise the changes made in response to the public consultation.
- The final SEA reports for Greece's FRMPs are not available for download from the national FRMP website.

consultation results reports for each FRMP (except the Evros FRMP) (all not officially submitted) at: https://floods.ypeka.gr/index.php?option=com_content&view=article&id=19&Itemid=506

[120] https://floods.ypeka.gr/index.php?option=com_content&view=article&id=6&Itemid=505

[121] Draft, unapproved versions of the SEA reports were, however, found as deliverables of the consultancy projects, e.g. for the Western Peloponnese FRMP, EL01, (report P16) at: https://floods.ypeka.gr/index.php?option=com_content&view=article&id=1056&Itemid=1010

Annex A: Supplementary tables and charts on measures

This Annex gives an overview of the data on measures provided by Greece 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)[122], 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

[122] http://icm.eionet.europa.eu/schemas/dir200760ec/resources

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.
- 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".

List of Annex A tables and figures

Types of measures used in reporting

The following table[123] 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'.

Table A 1: Types of measures used in reporting

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

Measures: overview

Table A 2: Total number of measures

Number of individual measures	119
Number of individual measures including measures which have been allocated to more than one measure type	0
Number of aggregated measures	263
Number of aggregated measures including measures which have been allocated to more than one measure type	0
Total number of measures	382
Total number of measures including measures which have been allocated to more than one measure type	0
Range of number of measures between UoMs including measures which have been allocated to more than one measure type	23-51

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

(Min-Max)	
Average number of measures across UoMs	27

Table A 3: Number of aggregated measures per measure type and UoM

	Prevention		Protection				Preparedness			Recovery & Review		Grand Total
	M23	M24	M31	M33	M34	M35	M42	M43	M44	M51	M53	
EL01	2	2	1	2	1	3	2	2	2	1	1	19
EL02	2	2	1	2	1	4	2	1	2	1	1	19
EL03	2	2	1	2	1	3	2	2	2	1	1	19
EL04	2	2	1	2	1	3	1	2	2	1	1	18
EL05	2	2	1	2	1	3	1	2	2	1	1	18
EL06	2	2	1	1	1	3	2	2	2	1	1	18
EL07	2	2	1	2	1	3	2	2	2	1	2	20
EL08	2	2	1	2	1	3	1	2	2	1	1	18
EL09	2	2	1	2	1	3	2	2	2	1	1	19
EL10	2	2	1	2	1	3	2	2	2	1	1	19
EL11	2	2	1	2	1	3	1	2	2	1	2	19
EL12	2	2	1	2	1	4	2	2	2	1	2	21
EL13	2	2	1	2	1	3	2	2	2	1	1	19
EL14	2	2	1	1	1	3	1	2	2	1	1	17
Grand Total	**28**	**28**	**14**	**26**	**14**	**44**	**23**	**27**	**28**	**14**	**17**	**263**
Average	**2**	**2**	**1**	**2**	**1**	**3**	**2**	**2**	**2**	**1**	**1**	**19**

Table A 4: Number of individual measures per measure type and UoM

	Prevention				Protection				Prepa-redness		Recovery & Review		Other	Grand Total
	M21	M22	M23	M24	M32	M33	M34	M35	M41	M42	M51	M53	M61	
EL01				2	2			1	1				1	7
EL02				2	2				1				1	6
EL03				2	2			1	1				1	7
EL04				2	2			1	1				1	7
EL05				2	2			1	1				1	7
EL06				2	2			1	1				1	7
EL07				2	1			1	1				1	6

	Prevention				Protection				Prepa-redness		Recovery & Review		Other	Grand Total
	M21	**M22**	**M23**	**M24**	**M32**	**M33**	**M34**	**M35**	**M41**	**M42**	**M51**	**M53**	**M61**	
EL08				2	2			1	1	1			1	8
EL09				2	2			1	1				1	7
EL10				2	2			1	1				1	7
EL11				2	2			1	1				1	7
EL12	2	1	1	6	3	6	1	3	2	1	2	1	1	30
EL13				2	2			1	1				1	7
EL14				2	2			1					1	6
Grand Total	**2**	**1**	**1**	**32**	**28**	**6**	**1**	**15**	**14**	**2**	**2**	**1**	**14**	**119**
Average	0	0	0	2	2	0	0	1	1	0	0	0	1	9

Table A 5: Total number of measures (aggregated and individual)

	Preparedness		Prepa-redness Total	Prevention		Preven-tion Total	Protection		Protec-tion Total	Recovery & Review		Recovery & Review Total	Other	Other Total	Grand Total
	Aggre-gated	Indi-vidual		Aggre-gated	Indi-vidual		Aggre-gated	Indi-vidual		Aggre-gated	Indi-vidual		Indi-vidual		
EL01	6	1	7	4	2	6	7	3	10	2		2	1	1	26
EL02	5	1	6	4	2	6	8	2	10	2		2	1	1	25
EL03	6	1	7	4	2	6	7	3	10	2		2	1	1	26
EL04	5	1	6	4	2	6	7	3	10	2		2	1	1	25
EL05	5	1	6	4	2	6	7	3	10	2		2	1	1	25
EL06	6	1	7	4	2	6	6	3	9	2		2	1	1	25
EL07	6	1	7	4	2	6	7	2	9	3		3	1	1	26
EL08	5	2	7	4	2	6	7	3	10	2		2	1	1	26
EL09	6	1	7	4	2	6	7	3	10	2		2	1	1	26
EL10	6	1	7	4	2	6	7	3	10	2		2	1	1	26
EL11	5	1	6	4	2	6	7	3	10	3		3	1	1	26
EL12	6	3	9	4	10	14	8	13	21	3	3	6	1	1	51
EL13	6	1	7	4	2	6	7	3	10	2		2	1	1	26
EL14	5		5	4	2	6	6	3	9	2		2	1	1	23
Grand Total	**78**	**16**	**94**	**56**	**36**	**92**	**98**	**50**	**148**	**31**	**3**	**34**	**14**	**14**	**382**
Average	**6**	**1**	**7**	**4**	**3**	**7**	**7**	**4**	**11**	**2**	**0**	**2**	**1**	**1**	**27**

The information in the table is visualised in the two Figures below:

Figure A 1: Number of total measures (individual and aggregated) by measure aspect

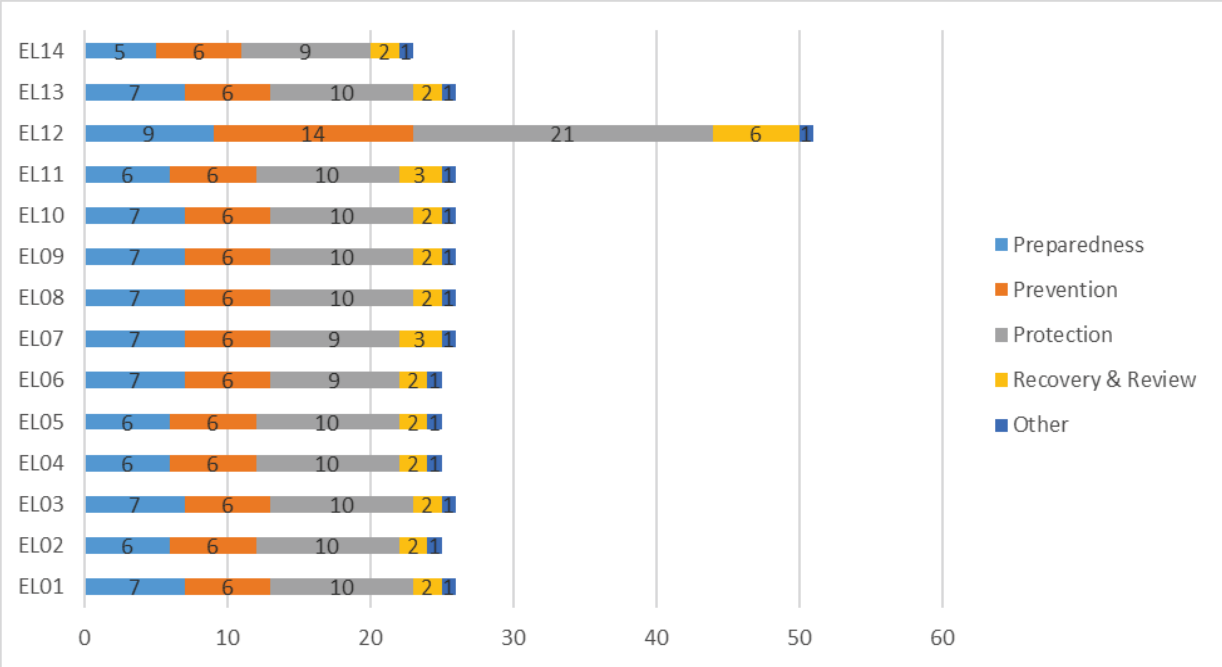
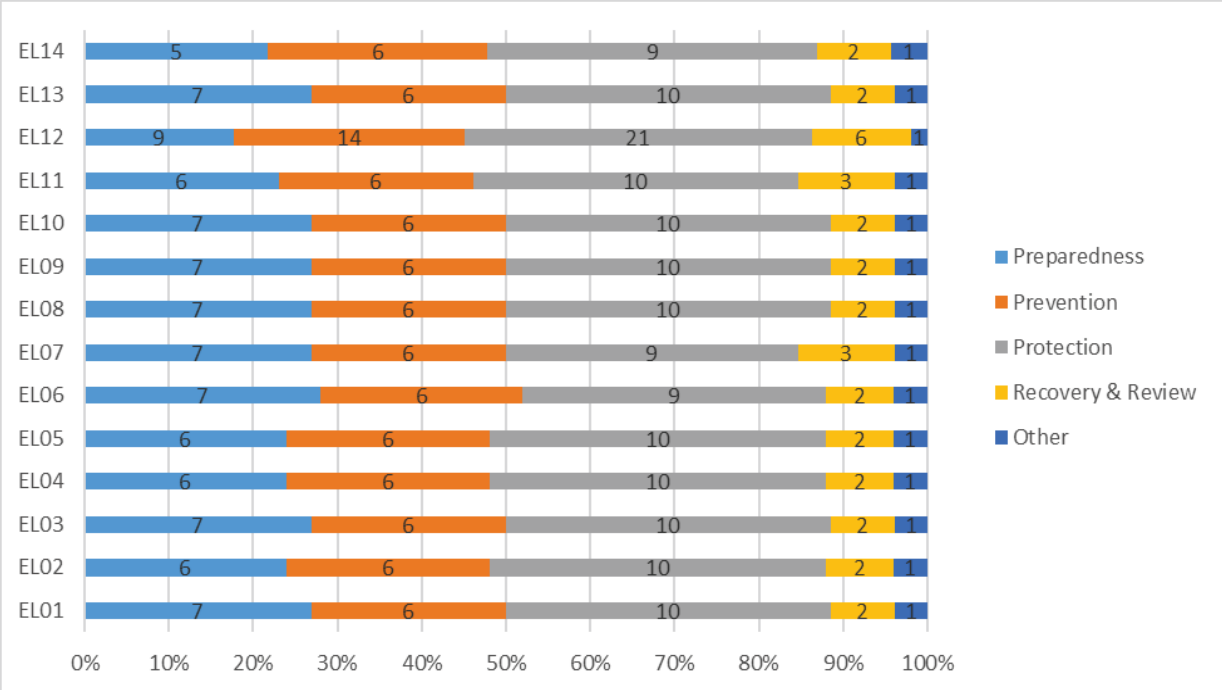


Figure A 2: Share of total measures (aggregated and individual) by measure aspect



Measure details: cost

Member States were requested to report information on:

- Cost (optional field)
- Cost explanation (optional field)

Greece provided in information on cost for all but five measures. The cost ranged from less than 100 euros (these costs were specified as being estimates to 95 million euros. The information was categorised and the summaries are presented in the following tables.

Table A 6: Cost by measure aspect (EUR)

Row Labels	0	1 - 1000	1 - 5 Million	1001 - 1 Million	>5 Million	No information	Grand Total
Preparedness	35	26	12	19		2	94
Prevention	1	48		43			92
Protection	19	35	45	34	12	3	148
Recovery & Review	14	9		11			34
Other		7		7			14
Grand Total	**69**	**125**	**57**	**114**	**12**	**5**	**382**

Figure A 3: Visualisation of Table 5: Cost by measure aspect (EUR)

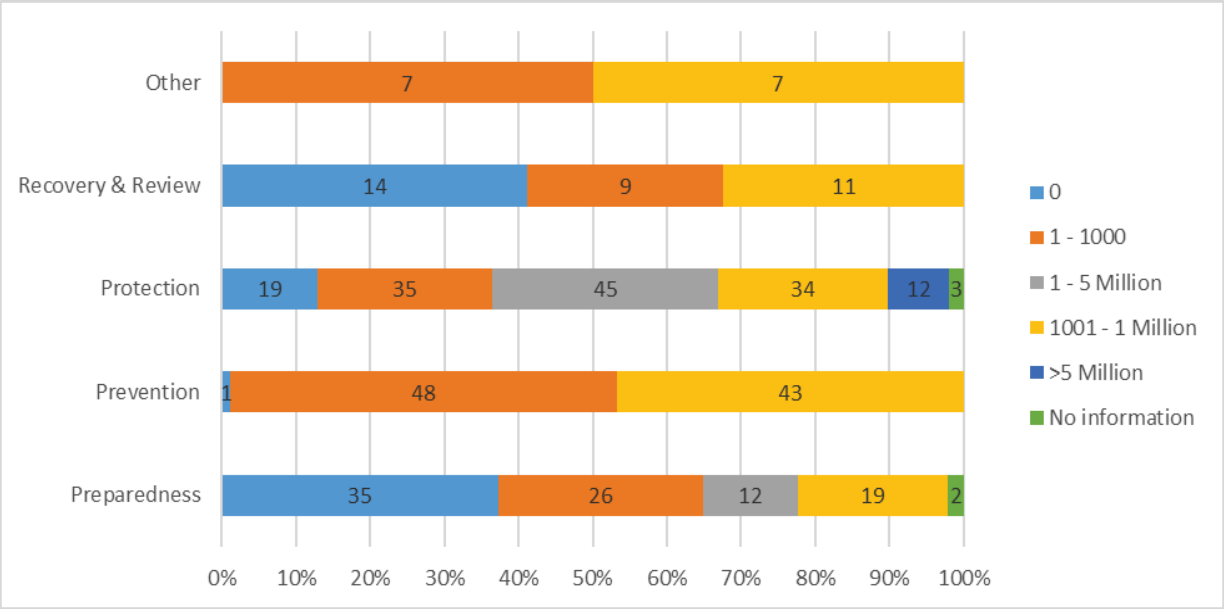
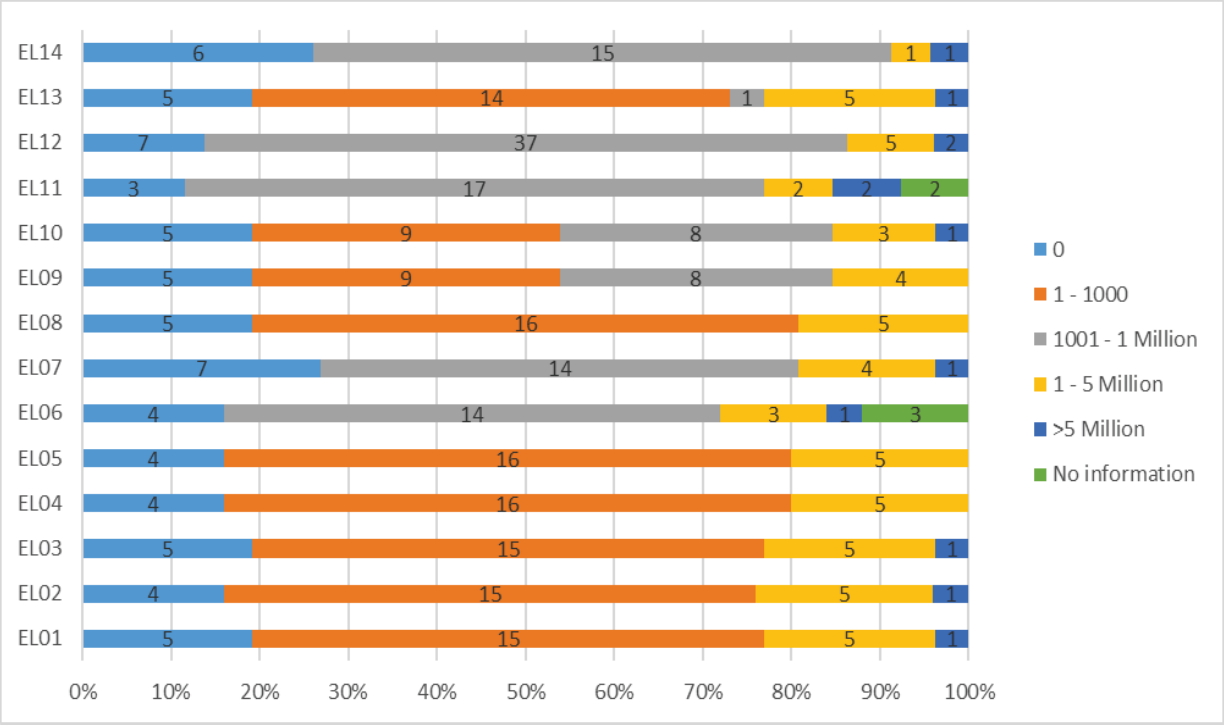


Table A 7: Total: Cost by UoM (EUR)

	No cost	1 – 1000 EUR	1001 - 1 Million EUR	1 - 5 Million EUR	>5 Million EUR	No infor-mation	Grand Total
EL01	5	15		5	1		26
EL02	4	15		5	1		25
EL03	5	15		5	1		26

	No cost	1 – 1000 EUR	1001 - 1 Million EUR	1 - 5 Million EUR	>5 Million EUR	No infor-mation	Grand Total
EL04	4	16		5			25
EL05	4	16		5			25
EL06	4		14	3	1	3	25
EL07	7		14	4	1		26
EL08	5	16		5			26
EL09	5	9	8	4			26
EL10	5	9	8	3	1		26
EL11	3		17	2	2	2	26
EL12	7		37	5	2		51
EL13	5	14	1	5	1		26
EL14	6		15	1	1		23
Grand Total	**69**	**125**	**114**	**57**	**12**	**5**	**382**
Average	**5**	**9**	**8**	**4**	**1**	**0**	**27**

Figure A 4: Visualisation of Table 6: Cost by UoM (EUR)



Greece also provided a lot of information on the cost explanation, however, it was not possible to summarise this information into a table.

Measure details: name & location

Member States were requested to report information on:

- Location of implementation of measures (mandatory field)
- Geographic coverage of the impact of measures (optional field)

Location of measures

The Location was reported for each measure, with a total of 177 different responses. It is therefore not possible to aggregate them, however, it was noted that many had APSFR references.

The Geographic Coverage was also reported for each measure, with 141 different responses. Again it was noted that many had reference to APSFRs.

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 objective for each measure was reported by Greece, with a total of 84 different responses. It is therefore not possible to aggregate the information.

Category of priority

Greece reported the category of priority for 179 out of a total of 382 measures. The following categories are used:

- Critical
- Very high
- High
- Moderate

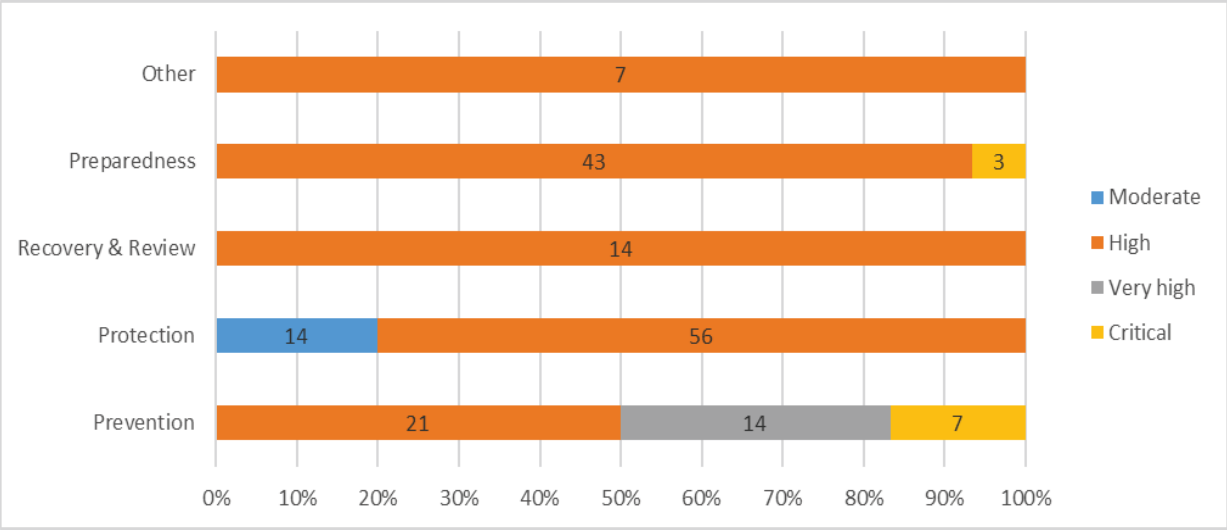
Table A 8: Category of Priority by measure aspect

	Moderate	High	Very high	Critical	Grand Total
Prevention		21	14	7	42
Protection	14	56			70
Recovery & Review		14			14
Preparedness		43		3	46
Other		7			7
Grand Total	**14**	**141**	**14**	**10**	**179**

Notes:

No measures were categorised as low

Figure A 5: Visualisation of Table 7: Category of Priority by measure aspect



Notes:

No measures were categorised as low

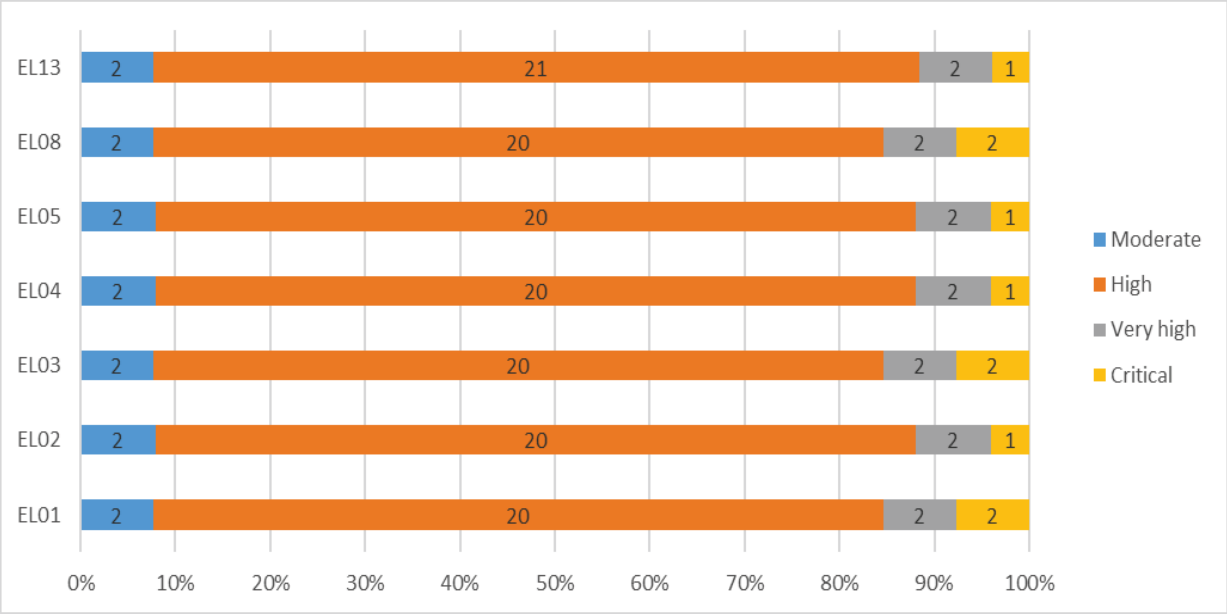
Table A 9: Category of Priority by UoM

	Moderate	High	Very high	Critical	Grand Total
EL01	2	20	2	2	26
EL02	2	20	2	1	25
EL03	2	20	2	2	26
EL04	2	20	2	1	25
EL05	2	20	2	1	25
EL08	2	20	2	2	26
EL13	2	21	2	1	26
Grand Total	**14**	**141**	**14**	**10**	**179**
Average	**2**	**20**	**2**	**1**	**26**

Notes:

No measures were categorised as low. Not all UoMs reported a Category of Priority

Figure A 6: Visualisation of Table 8: Category of Priority by UoM



Notes:

No measures were categorised as low. Not all UoMs reported a Category of Priority

Timetable

No information has been reported by Greece on the timetable.

Table A 10: Timetable by measure aspect

	Short term	Short-medium term	Medium term	Long term	Start 2018, end 2019	Start 2018, end 2020	Start 2018, end 2021	Start 2019, end 2020	Start 2019, end 2021	Start 2019, end after 2021	No information	Grand Total
Prevention	34		4			9	27		18			92
Preparedness	31	2	1		1	16	15		9	18	1	94
Protection	27	24	6	1			18	9	9	53	1	148
Recovery & Review	11		5		9	9						34
Other	5						9					14
Grand Total	108	26	16	1	10	34	69	9	36	71	2	382

Figure A 7: Visualisation of Table 13: Timetable by measure aspect

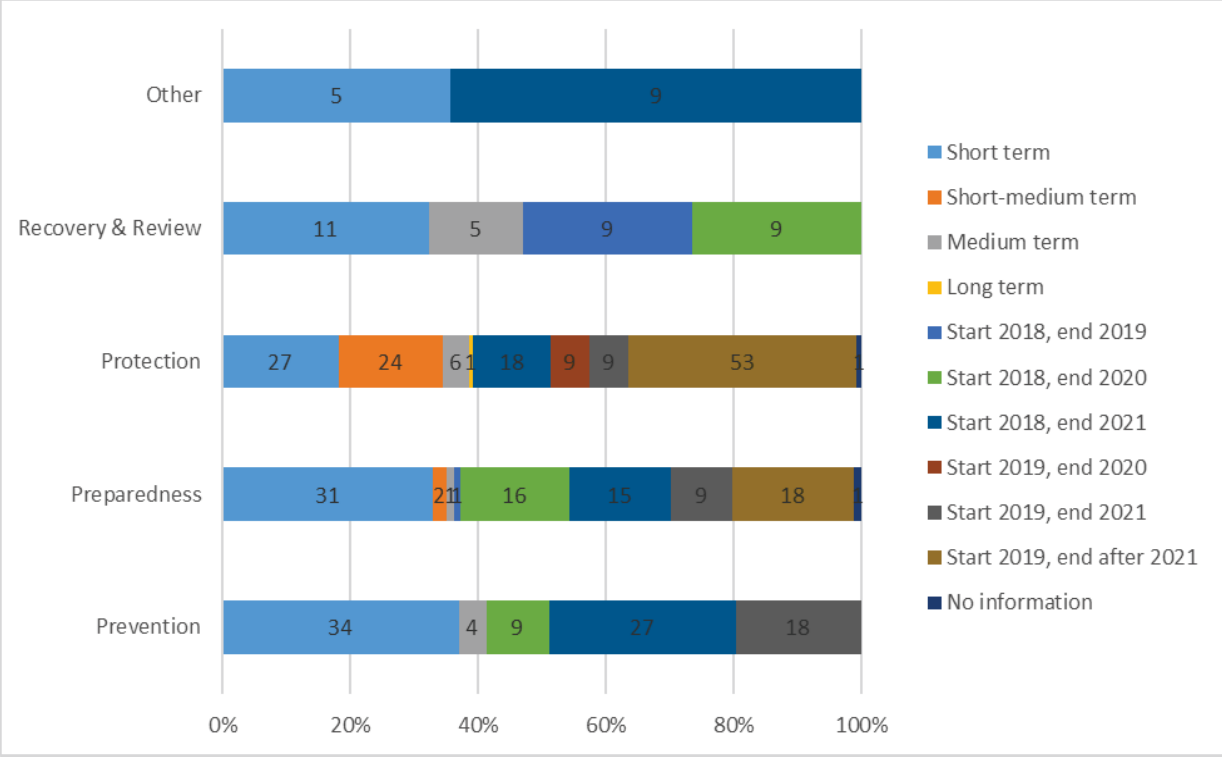
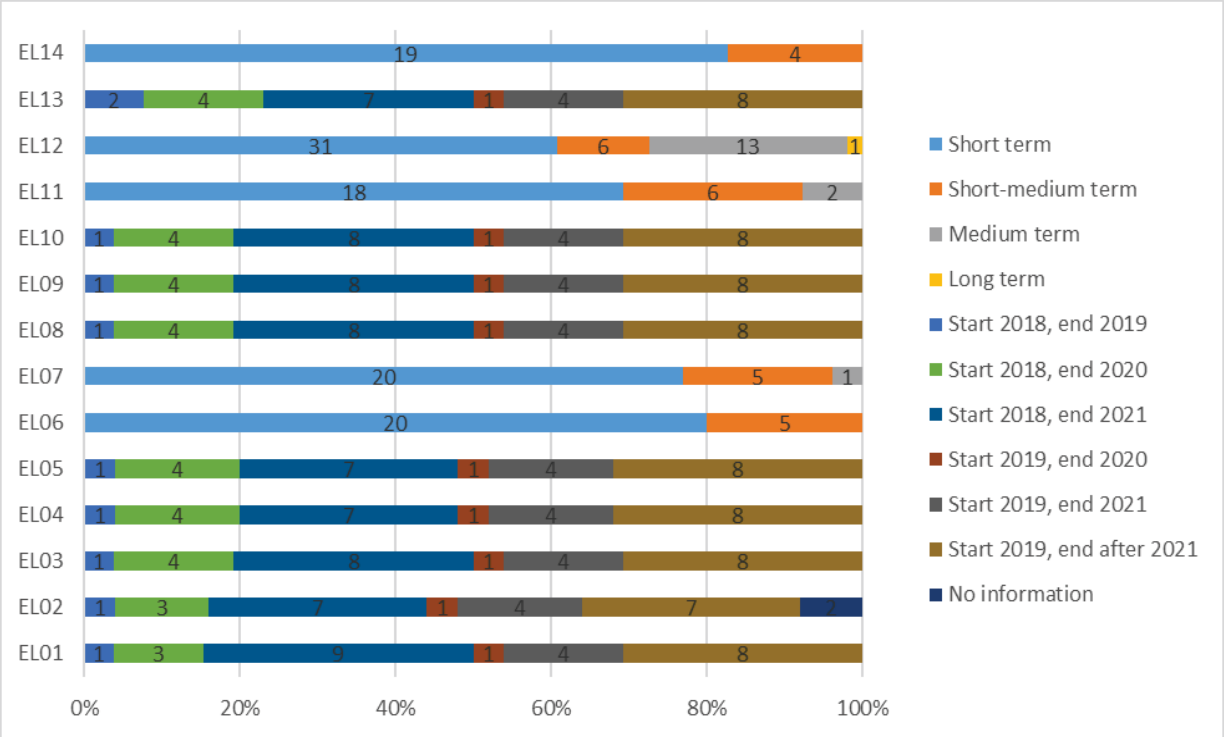


Table A 11: Timetable by UoM

	Short term	Short-medium term	Medium term	Long term	Start 2018, end 2019	Start 2018, end 2020	Start 2018, end 2021	Start 2019, end 2020	Start 2019, end 2021	Start 2019, end after 2021	No infor-mation	Grand Total
EL01					1	3	9	1	4	8		26
EL02					1	3	7	1	4	7	2	25
EL03					1	4	8	1	4	8		26
EL04					1	4	7	1	4	8		25
EL05					1	4	7	1	4	8		25
EL06	20	5										25
EL07	20	5	1									26
EL08					1	4	8	1	4	8		26
EL09					1	4	8	1	4	8		26
EL10					1	4	8	1	4	8		26
EL11	18	6	2									26
EL12	31	6	13	1								51
EL13					2	4	7	1	4	8		26
EL14	19	4										23
Grand Total	108	26	16	1	10	34	69	9	36	71	2	382
Average	8	2	1	0	1	2	5	1	3	5	0	27

Figure A 8: Visualisation of Table 14: Timetable by measure aspect



Measure details: authorities

Member States were requested to report information on:

- Name of the responsible authority
- Level of responsibility

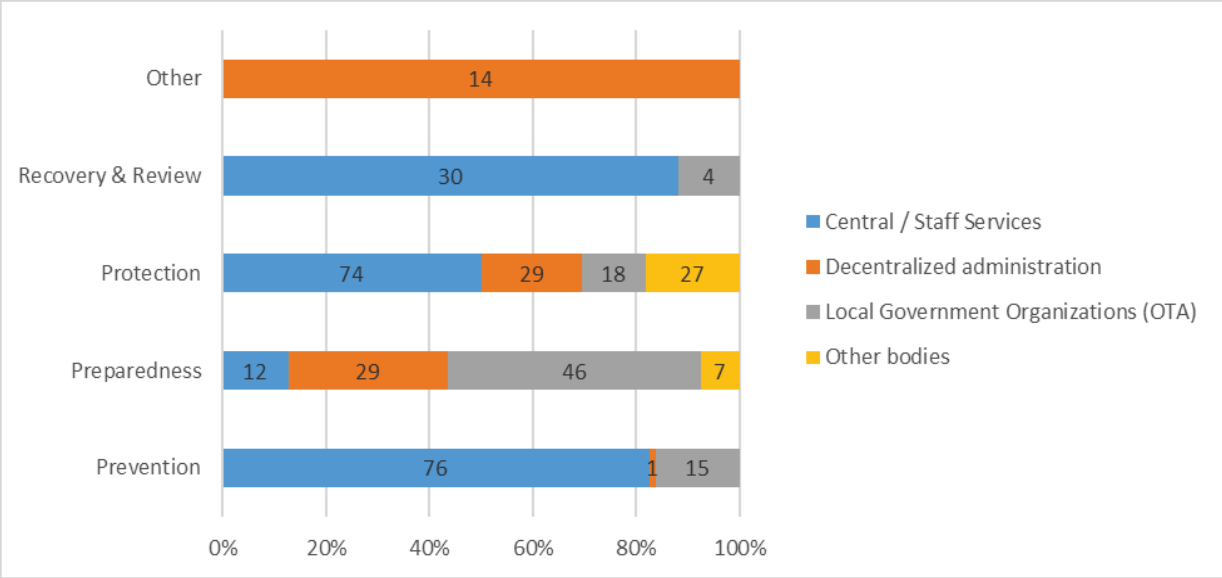
Greece reported the name(s) of the responsibilities responsible for each measure. In total, 139 unique authorities and combinations were reported, so it is not possible to aggregate them. However, Greece also reported the level of responsibility in a consistent fashion, which is summarised in the following tables.

Table A 12: Level of Responsibility by measure aspect

	Central / Staff Services	Decentralized administration	Local Government Organizations (OTA)	Other bodies	Grand Total
Prevention	76	1	15		92
Preparedness	12	29	46	7	94
Protection	74	29	18	27	148
Recovery & Review	30		4		34
Other		14			14
Grand Total	**192**	**73**	**83**	**34**	**382**

Notes: “Staff Services” is not further explained in the Reporting Sheets.

Figure A 9: Visualisation of Table 15: Level of Responsible Authority by measure aspect



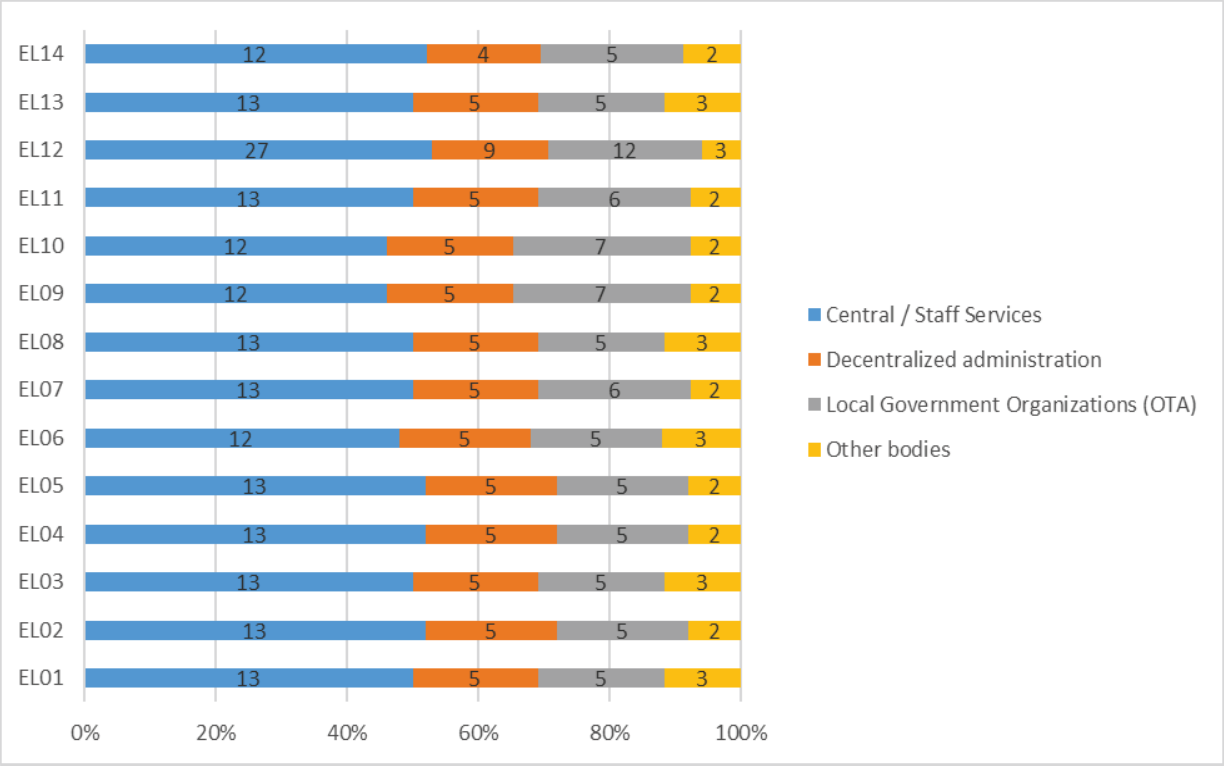
Notes: “Staff Services” is not further explained in the Reporting Sheets.

Table A 13: Level of Responsible Authority by UoM

	Central / Staff Services	Decentralized administration	Local Government Organizations (OTA)	Other bodies	Grand Total
EL01	13	5	5	3	26
EL02	13	5	5	2	25
EL03	13	5	5	3	26
EL04	13	5	5	2	25
EL05	13	5	5	2	25
EL06	12	5	5	3	25
EL07	13	5	6	2	26
EL08	13	5	5	3	26
EL09	12	5	7	2	26
EL10	12	5	7	2	26
EL11	13	5	6	2	26
EL12	27	9	12	3	51
EL13	13	5	5	3	26
EL14	12	4	5	2	23
Grand Total	**192**	**73**	**83**	**34**	**382**
Average	14	5	6	2	27

Notes: “Staff Services” is not further explained in the Reporting Sheets.

Figure A 10: Visualisation of Table 16: Level of Responsible Authority by UoM



Notes: "Staff Services" is not further explained in the Reporting Sheets.

Measure details: progress

Member States were requested to report information on:

- Progress of implementation of measures (mandatory field)
- Progress description of the implementation of measures (optional field)

The progress of implementation was reported by Greece as:

- 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.

Progress description was reported for 231 measures, with 190 reported as "Implementing agencies have been appointed". Another 27 were reported as "Implementation agencies have been appointed and the measure is in progress"

Table A 14: Progress of implementation by measure aspect

	Ongoing construction	Progress ongoing	Not started	Grand Total
Prevention	8	5	79	92
Protection	18	15	115	148
Preparedness	5	5	84	94
Recovery & Review	5	3	26	34
Other			14	14
Grand Total	**36**	**28**	**318**	**382**

Figure A 11: Visualisation of Table 17: Progress of implementation by measure aspect

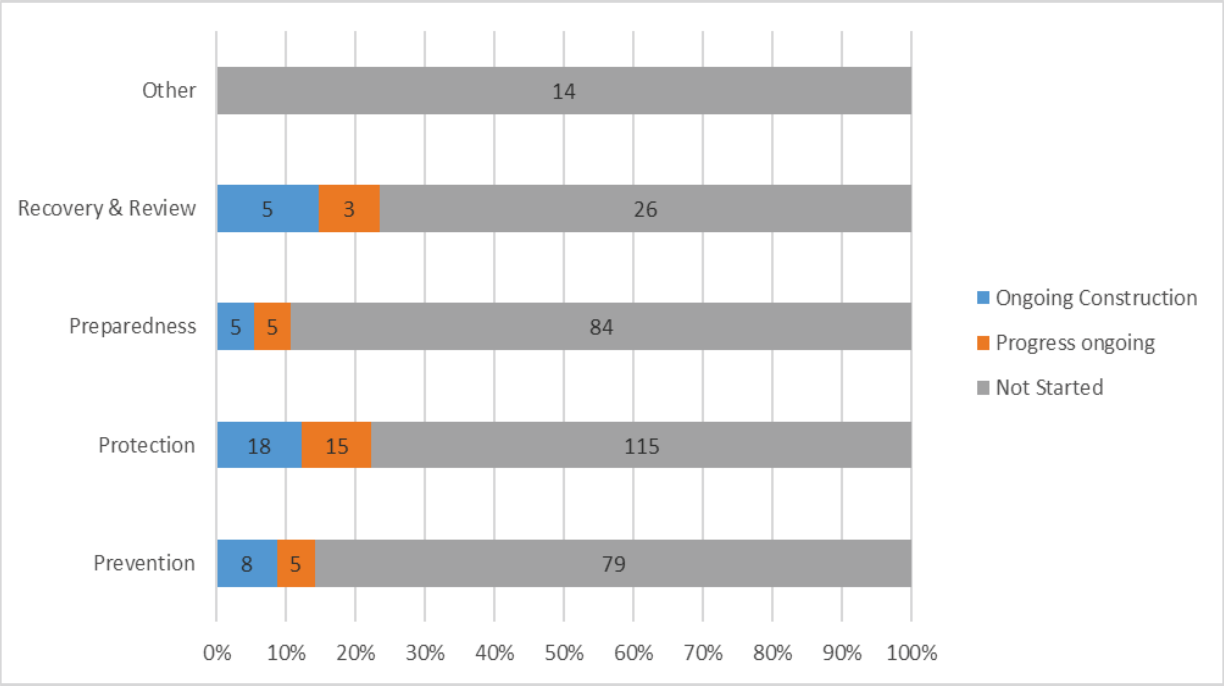
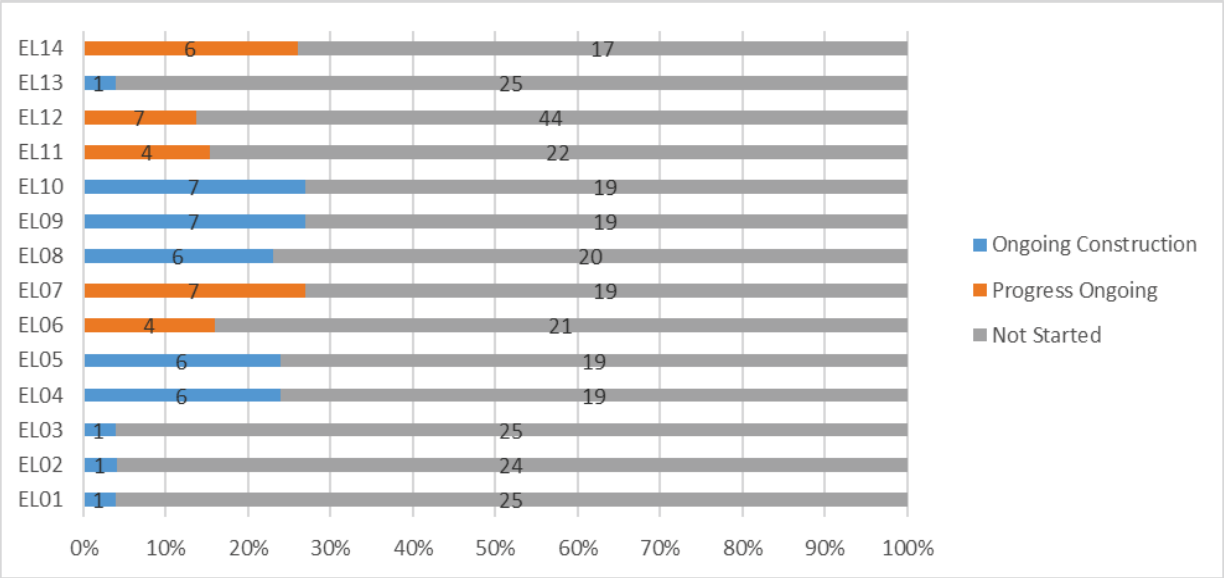


Table A 15: Progress of implementation by UoM

	Ongoing Construction	Progress Ongoing	Not Started	Grand Total
EL01	1		25	26
EL02	1		24	25
EL03	1		25	26
EL04	6		19	25
EL05	6		19	25
EL06		4	21	25
EL07		7	19	26
EL08	6		20	26
EL09	7		19	26
EL10	7		19	26
EL11		4	22	26

	Ongoing Construction	Progress Ongoing	Not Started	Grand Total
EL12		7	44	51
EL13	1		25	26
EL14		6	17	23
Grand Total	**36**	**28**	**318**	**382**
Average	3	2	23	27

Figure A 12: Visualisation of Table 18: Progress of implementation by UoM



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 Act associated to the measures reported (optional field)
- Any other information reported (optional field)

No other information was reported.

Annex B: Definitions of measure types

Table B1 Types of flood risk management measures124

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

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

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

Catalogue of Natural Water Retention Measures (NWRM)

NWRM cover a wide range of actions and land use types. Many different measures can act as NWRM, by encouraging the retention of water within a catchment and, through that, enhancing the natural functioning of the catchment. The catalogue developed in the NWRM project represents a comprehensive but non prescriptive wide range of measures, 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

Agriculture	Forest	Hydro Morphology	Urban
A01 Meadows and pastures	F01 Forest riparian buffers	N01 Basins and ponds	U01 Green Roofs
A02 Buffer strips and hedges	F02 Maintenance of forest cover in headwater areas	N02 Wetland restoration and management	U02 Rainwater Harvesting
A03 Crop rotation	F03 Afforestation of reservoir catchments	N03 Floodplain restoration and management	U03 Permeable surfaces
A04 Strip cropping along contours	F04 Targeted planting for 'catching' precipitation	N04 Re-meandering	U04 Swales
A05 Intercropping	F05 Land use conversion	N05 Stream bed re-naturalization	U05 Channels and rills
A06 No till agriculture	F06 Continuous cover forestry	N06 Restoration and reconnection of seasonal streams	U06 Filter Strips
A07 Low till agriculture	F07 'Water sensitive'	N07 Reconnection of	U07 Soakaways

Agriculture	Forest	Hydro Morphology	Urban
	driving	oxbow lakes and similar 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