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First Flood Risk Management Plans - Member State: Estonia

Accompanying the document

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

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

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Acronyms

APSFR	Areas of Potential Significant Flood Risk
CBA	Cost-Benefit Analysis
EEA	European Environment Agency
FD	Floods Directive
FHRM	Flood Hazard and Risk Map
FRMP	Flood Risk Management Plan
NGO	Non-Governmental Organisation
NWRM	Natural Water Retention Measures
PFRA	Preliminary Flood Risk Assessments
PoM	Programme of Measures
RBD	River Basin District
RBMP	River Basin Management Plan
SEA	Strategic Environmental Assessment
UoM	Unit of Management
WFD	Water Framework Directive
WISE	Water Information System for Europe

Introduction

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

This version of the report assesses the FRMPs for Estonia¹. 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 as per Articles 7 and 15 of the FD²: this reporting provides an overview of the plans and details on their measures.
- The FRMPs: Estonia has three Units of Management (UoMs) and it reported a FRMP for each UoM. All three FRMPs are covered in this assessment.

In addition to the FRMPs, Estonia has published an Action Plan for 2016-2021³: this was also covered in the assessment.

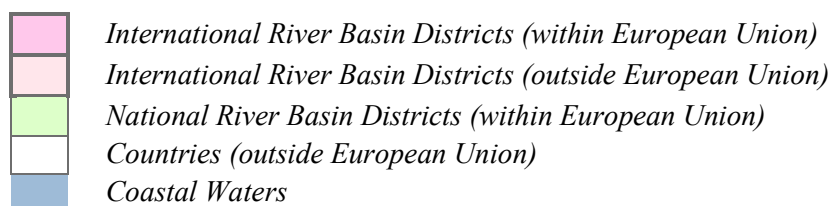
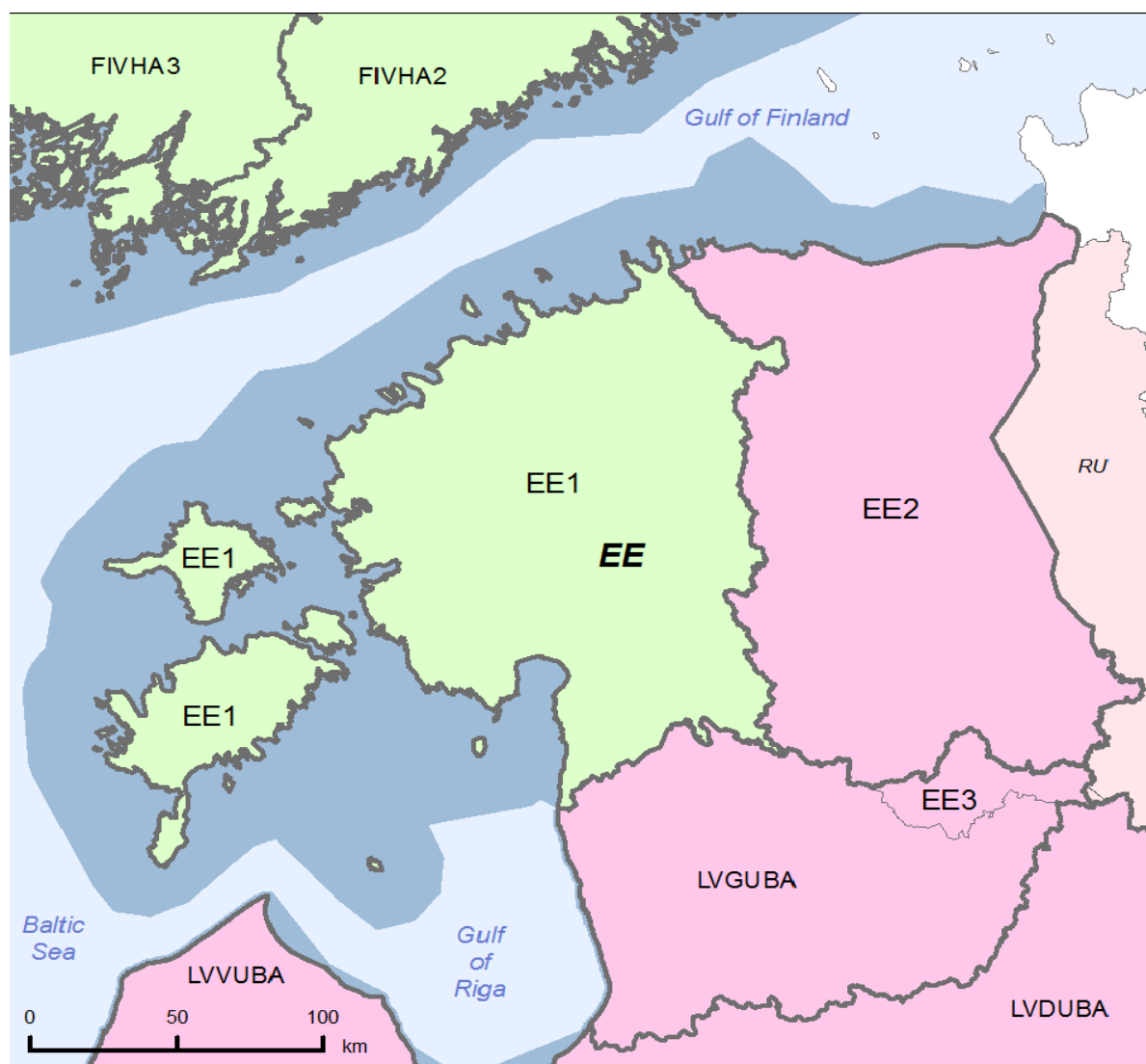
¹ The present Member State assessment reports reflect the situation as reported by each Member State to the Commission in 2016 or 2017 and with reference to FRMPs prepared earlier. The situation in the Member States may have altered since then.

² Referred to as “Reporting Sheets” throughout this report. Data must be reported in a clear and consistent way by all Member States. The format for reporting was jointly elaborated by the Member States and the Commission as part of a collaborative process called the “Common Implementation Strategy”:
http://ec.europa.eu/environment/water/water-framework/objectives/implementation_en.htm
Whereas a key role of the Commission is to check compliance with EU legislation, the Commission also seeks information to allow it to determine whether existing policies are adequate. It also requires certain information to create a European-wide picture to inform the public.

³ Flood Risk Management Plans – an Action Plan for 2016-2021 (Üleujutusohuga seotud riskide maandamiskavade meetmekava 2016-2021).

Overview

Figure 1 Map of Units of Management/River Basin Districts



Source: WISE, Eurostat (country borders) as presented in the 2012 RBMP assessment reports

Estonia is divided into three Units of Management (UoMs), which correspond to the River Basin Districts (RBDs) under the Water Framework Directive (WFD). There is one FRMP for each UoM – West-Estonian (EE1), East-Estonian (EE2) and Koiva (EE3). The FRMPs are managed at national level, as are the River Basin Management Plans (RBMPs) under the WFD. As a result, the three FRMPs have similar structures and content.

An FRMP has been developed for the Koiva UoM (EE3), even though no APSFRs have been identified. In the Koiva UoM (based on information obtained from the FRMP itself), the aim is to avoid and minimise risks from potential floods, and the main focus is on measures for sustaining and improving the natural water retention capacities of the landscape.

In addition to the FRMPs, an Action Plan for 2016-2021 has been prepared and published, containing more detailed information about measures. The Action Plan is presented as an annex in all the FRMPs, is cited in the text of the FRMPs, and is published on the internet alongside the FRMPs.

The FRMPs and the Action Plan were approved by the government on 7 January 2016.

The table below gives an overview of all UoMs in Estonia, including the UoM code, the name, and the number of APSFRs reported. It also shows if all documents required for each UoM were submitted to European Environment Agency's (EEA) WISE⁴ – the FRMP as a PDF and the reporting sheet as an XML.

Table 1 *Overview of UoMs in Estonia*

UoM	Name	Number of APSFRs	XML reported	PDF Reported
EE1	WEST-ESTONIAN	15	Yes	Yes
EE2	EAST-ESTONIAN	5	Yes	Yes
EE3	KOIVA	0	Yes	Yes
TOTAL		20		

The FRMPs and the Action Plan are available from the following web page:

- <http://www.envir.ee/et/uleujutused>

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>

Overview of the assessment

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

- **Evidence to the contrary:** An explicit statement was found stating that the criterion was not met;
- **No evidence:** No information found to indicate that the criterion was met;
- **Some evidence:** Reference to the criterion is brief and vague, without a clear indication of the approach used for the criterion. Depending on the comment in the adjacent column, “some evidence” could also be construed as “weak evidence”;
- **Strong evidence:** Clear information provided, describing an approach followed in the FRMP to address the criterion.

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

Criterion	Evidence	Comments
FRM objectives have been established	Strong evidence	The three FRMPs all set out objectives. The FRMPs for the West-Estonian and East-Estonian UoMs (EE1 and EE2) set two general objectives: to protect existing sites from flooding and to ban, or restrict, new buildings in flood risk areas. These two FRMPs, which contain APSFRs, as well as the FRMP for Koiva (EE3), which does not, set out further objectives.
FRM objectives relate to...		
...the reduction of potential adverse consequences	Strong evidence	The first objective, as noted above, is to protect existing sites from flood. It is moreover stated in the FRMPs that the objectives have been developed in order to reduce or avoid the impacts of flooding on human health, natural environment, cultural heritage and economic activity.
...to the reduction of the likelihood of flooding	Strong evidence	Among the more specific objectives, the FRMPs call for preventing flooding by reducing flood risk areas and preventing building in flood risk areas.
...to non-structural initiatives	Strong evidence	As noted above, one of the general objectives for EE1 and EE2 is to restrict construction in

Criterion	Evidence	Comments
		flood risk areas. One of the specific objectives is to ensure preparedness for flooding.
FRM objectives consider relevant potential adverse consequences to...		
...human health	Strong evidence	While human health is not specifically identified in the objectives, the FRMPs underline that the objectives have been developed in order to reduce or avoid the impacts of flooding on human health, natural environment, cultural heritage and economic activity.
...economic activity	Strong evidence	See above under ‘human health’
...environment	Strong evidence	See above under ‘human health’
...cultural heritage	Strong evidence	See above under ‘human health’
Measures have been...		
...identified	Strong evidence	Estonia’s FRMPs and Action Plan present a three-level system with 12 “measure groups” (defined and listed in the FRMPs and in the associated Action Plan), which in turn consist of 24 measures and 110 actions. Estonia, however, has only reported on the second level, the measures.
...prioritised	Some evidence	Estonia has reported priorities for its measures (the second level of its three-part structure). The Action Plan moreover identifies APSFR-specific priorities for the majority of the 110 actions. The FRMPs provide information on the method for prioritisation of the actions: legally required actions are assigned high priority; for non-technical measures, higher priority is given to those that are related to protection of human life and health, in particular in densely populated areas, and to studies; for construction actions, cost-benefit analysis (CBA) is used.
Relevant aspects of Article 7 have been taken into account such as...		

Criterion	Evidence	Comments
...costs & benefits	Some evidence	The three FRMPs refer to CBA as a criterion for the establishment of priorities for the selection of actions, in particular for construction actions. Neither the methodology nor actual cost-benefit results, however, are presented in the FRMPs or the Action Plan.
...flood extent	Strong evidence	Both FHRMs and FRMPs provide information about probability scenarios of flooding events and also about the extent of floods accompanied with water depth estimates and indicate that this information was used in the development of measures.
...flood conveyance	No evidence	There is no evidence in the FRMPs whether flood conveyance routes have been taken into account or not. The PFRA report states that conveyance is not relevant for Estonia, as most floods in Estonia are slow fluvial floods, and consequently conveyance routes have not been described in the PFRA and FRMPs, and they have not been taken into account when planning the measures. ⁵
...water retention	Strong evidence	Natural Water Retention Measures (NWRMs) are included in the Action Plan and include actions in urban areas, such as green roofs and wetlands; in agricultural and forest lands.
...environmental objectives of the WFD	Some evidence	The FRMPs do not make a clear reference to the environmental objectives of the WFD (Article 4). Nevertheless, the Action Plan indicates whether each action is neutral, supporting or in conflict with Estonia's RBMPs.
...spatial planning/land use	Strong evidence	In Estonia's FRMPs, the first measure "block" sets out actions for "Limiting the

⁵ Estonia clarified subsequently that all previous information in the PFRA and the FHRM was taken into account when planning the measures. For example, it was considered how and where floods occur. A short description of conveyance routes is available in the PFRA report. Further, Estonia stated that conveyance routes are more relevant for flash floods.

Criterion	Evidence	Comments
		establishment and construction of new objects in flood risk areas". This measure block includes actions for 1) spatial planning to take into consideration flood risks, 2) defining non-construction areas, and 3) initiating assessments for evaluation of flood risk prior to building or reconstruction of various installations.
...nature conservation	Some evidence	All three FRMPs contain a brief note that they take into account nature protection aspects. The Action Plan refers to biodiversity and indicates for all actions, whether they reduce flood-related risks to habitats (i.e. potential significant negative impacts on Natura 2000 areas) or protected species (potential reduction in area of habitats of protected species).
...navigation/port infrastructure	Some evidence	All three FRMPs make a brief reference that they take into consideration navigation and port infrastructure. One action addresses pollution risks from ports in flood events.
...likely impact of climate change	Strong evidence	The FRMPs provide a chapter dedicated to climate change and how its impact is taken into account in planning the measures and actions. Measures are assessed for their sensitivity to climate change. The FRMPs, however, do not describe in detail the expected impacts of climate change on flooding events in Estonia and provide only a broad overview of shifts in importance of different flood sources. Moreover, climate change was not considered in the PFRA or the FHRMs.
Coordination with other countries ensured in the RBD/UoM	No evidence	Although Estonia shares UoMs with neighbouring Latvia and Russia, the FRMPs do not describe coordination with Latvia or Russia on flood risk management. The FRMPs note that no flood risk areas are shared with neighbouring countries.

Criterion	Evidence	Comments
Coordination ensured with WFD	Some evidence	As noted above, all actions have been assessed in terms of their compatibility with the RBMPs. The FRMPs do not explicitly explain, however, whether WFD objectives have been taken into account during the development of FRMP measures and actions.
Active involvement of interested parties	Strong evidence	Estonia organised 25 public meetings and workshops on the FRMPs, and also prepared an online survey whose results provided input to the FRMPs.

Good Practices

The assessment identified the following good practices in the Estonian FRMPs.

Table 3 *Good practices in the Estonian FRMPs*

Topic area	Good practices identified
Planning/implementing of measures and their prioritization for the achievement of objectives.	<p>The Action Plan provides details on measures and actions: their location and responsible authorities and, for some, information on costs and deadlines. Many of the actions are specific and measurable. Most actions have been prioritised at the level of UoMs and APSFRs. The methodology for prioritisation has been described in the FRMPs. The FRMPs and the Action Plan include measures and actions for sustainable land-use and NWRMs.</p> <p>An FRMP has been developed for the Koiva UoM (EE3), even though no APSFRs have been identified: its aim is to avoid and minimise risks from future floods and the main focus is on measures for sustaining and improving the natural water retention abilities of the landscape.</p> <p>A measure for preventing post-flood pollution has been proposed. The Action Plan assesses each action for its compatibility with the RBMP.</p>
Consideration of climate change in the FRMPs.	Climate change was addressed in the development of the FRMPs and the Action Plan: most importantly, the sensitivity of all actions to potential climate change was assessed. The methodology for this assessment is presented in the FRMPs.
Use of CBA in the FRMPs.	Cost benefit analysis is identified as a criterion for the prioritisation of construction actions, including NWRMs.
Public participation.	Several mechanisms have been used for involving stakeholders. In

Topic area	Good practices identified
	<p>total 25 workshops were held to present the FRMPs and gather feedback from stakeholders and the public. A survey was held to gather information on public awareness. A range of national and local government bodies provided input.</p> <p>Consultations on policy activities related to flood risk management, such as marine strategy and land management, were used to raise awareness and gather input on the FRMPs.</p>
Flood risk governance.	<p>The preparation of the FRMPs was coordinated with the preparation of the second RBMPs under the WFD via consultation with the Commission for River Basin Management on measures and actions (the Commission brings together government bodies, national experts and water service companies for coordination on the implementation of the WFD and RBMPs). Moreover, the Ministry of Environment was the lead competent authority for both documents.</p> <p>Coordination with local and national authorities took place as part of the development of the FRMPs.</p>

Areas for further development

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

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

Topic area	Areas for further development identified
Integration of previously reported information in the FRMPs.	<p>The FRMPs lack a detailed description of how the APSFRs and FHRMs have been used to prioritise objectives and/or measures. FHRMs have not been prepared for two of Estonia's 20 APSFRs.</p> <p>In cases of floods from multiple sources, the FRMPs do not indicate clearly how different flood sources have been considered and how their respective contributions to flood risk have been distinguished.</p>
Setting of objectives for the management of flood risk.	<p>The objectives are broad and are neither specific nor measurable.</p>
Planning/implementation of measures and their prioritisation for the achievement of objectives.	<p>While some budget information is provided, it has not been broken down per UoM. Budget information has not been provided for construction measures.</p> <p>Since the objectives are not specific or measurable, it is not clear how and by how much the measures and their actions will contribute to their achievement. There are no indicators or baselines for determining progress.</p> <p>No indicators for evaluating the impact and progress of measures and</p>

Topic area	Areas for further development identified
	actions are described, and no baseline is established. There is no description in the FRMPs or Action Plans how the progress and impact of the measures and actions will be monitored
Use of CBA in the FRMPs.	The FRMPs do not describe the methodology for CBA, nor present the results. The work on CBA may not be complete, as the FRMPs call for additional and more detailed analysis.
Public participation.	The FRMPs do not provide information on the specific comments and inputs received during consultation, nor on changes made in response to inputs from stakeholders or the public.
Flood risk governance.	The FRMPs are quite similar in content and do not describe in detail differences in flood risks across the UoMs and how such differences have influenced the programming of measures and actions. It appears that Strategic Environmental Assessments (SEAs) were not carried out for the FRMPs.

Recommendations

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

- To be able to assess progress, objectives should be specific and measurable to the extent possible and the FRMPs should describe the process for setting objectives.
- FRMPs should provide more detailed information on measure costs in each UoM. Developing indicators to measure progress in the implementation should be considered.
- The FRMPs should provide more UoM-specific information. Differences among the UoMs do not come out from the documents (except in case of EE3) – for example, how conditions in each UoM have influenced the selection of measures.
- The FRMPs should describe the methodology used for CBA and present the results.
- More detailed information should be provided on how the public and stakeholders were actively involved and how their inputs were considered.
- SEAs should be considered for Estonia's FRMPs.

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

1.1 Reporting of the FRMPs

Estonia has reported three FRMPs, one for each of its three UoMs. It also submitted an accompanying document – an Action Plan⁶ – which provides information about the measures and actions planned across all three FRMPs. The Action Plan is presented as an annex in all the FRMPs, is referred to in the text of the FRMPs and published online alongside the FRMPs.

Estonia did not make use of Article 13(3), which allowed Member States to use flood risk management plans finalised before December 2010 for the first cycle of the FD.

1.2 Assessment of the FRMPs

The assessment covered all three Estonian FRMPs:

Table 5 *UoMs in Estonian FRMPs*

UoM code	UoM Name
EE1	West-Estonian
EE2	East-Estonian
EE3	Koiva

In addition, Estonia's Action Plan has been taken into consideration in the assessment.

⁶ Flood Risk Management Plans – an Action Plan for 2016-2021 (*Üleujutusohuga seotud riskide maandamiskavade meetmekava 2016-2021*).

2. Integration of previously reported information

2.1 Conclusions drawn from the preliminary flood risk assessment

The conclusions of the PFRA are presented in all three FRMPs, including in the FRMP for the Koiva UoM (EE3), despite the fact that no APSFRs had been identified there. All three FRMPs provide a textual description, including of the methodology employed in the previous steps and their results. The two FRMPs for UoMs where APSFRs were identified (EE1 and EE2) had a summary map showing these areas, including tables listing the APSFRs. Although two RBDs/UoMs (EE2 and EE3) are shared with neighbouring Member States, there are no international flood risk areas identified in these UoMs⁷.

The PFRA considered floods from fluvial, pluvial, groundwater and seawater sources and floods from artificial water-bearing infrastructure. The PFRA also considered other flood sources, mainly wind-related flooding on large lakes. The FRMPs do not indicate clearly, however, how different flood sources might act in combination and, in such cases, their respective contributions to flood risk have not been distinguished in the APSFRs.

Links to maps of the APSFRs have been provided as URLs in the FRMPs for EE1 and EE2: the FRMPs provide a link to the page of the Ministry of the Environment⁸, which provides maps of the APSFRs and the FHRMs⁹.

Conveyance routes have been acknowledged in the FRMPs as part of PFRA requirements under the Floods Directive but were not taken into account¹⁰. There are no further details in the FRMPs: instead, the PFRA report explains that information on flood conveyance routes is important in case of sudden rise of water level or water flows, where this information can be used to designate a vulnerable area. This is not the case for major floods in Estonia, which are mostly related to fluvial and seawater floods. Due to the local conditions, conveyance routes are clear and stable and the changes in water level take place slowly. Floodwater movements in major flood areas in Estonia have not been sudden and abrupt, both rising and receding along river courses¹¹.

⁷ FRMP: EE1 page 11-14; FRMP: EE2 page 10-12; FRMP: EE3 page 9-10.

⁸ <http://www.envir.ee/et/uleujutusohuga-seotud-riskide-esialgne-hinnang>

⁹ The links are found on FRMP: EE1 page 11; FRMP: EE2 page 10; FRMP: EE3 page 9.

¹⁰ Estonia stated subsequently that it omitted to mention in the FRMP that conveyance routes were taken into account.

¹¹ FRMP: EE1 page 11; FRMP: EE2 page 10; FRMP: EE3 page 9. The pages have references to the PFRA report via link to the Ministry of the Environment where there is a direct link to the document. For the 1st cycle PFRA information is on <https://www.envir.ee/et/uleujutusohuga-seotud-riskide-maandamiskavad-i-tsukkel> and for the 2nd cycle on <http://www.envir.ee/et/uleujutusohuga-seotud-riskide-esialgne-hinnang>

2.1.1 Coordination with neighbouring Member States on shared RBDs/UoMs

Although two RBDs/UoMs (EE2, East Estonian, and EE3, Koiva) are shared with neighbouring Member States, no international flood risk areas identified and assigned for the FRMPs. The FRMPs do not indicate if the identification of flood risk areas was coordinated with neighbouring Member States¹².

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

All three FRMPs explain that the FHR maps were prepared for flood risk areas (APSFRs) assigned previously in the PFRA, which assessed the identified areas with more detail. However, further details are not provided¹³.

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

FHRMs were prepared for 18 areas located in the EE1 (West-Estonian) and EE2 (East-Estonian) UoMs, compared to the initially designated 20 APSFRs. Two flood risk areas, one in EE1 and one in EE2 have not yet been mapped for flood hazard and flood risk because of uncertainties in the determination of flood extents and probabilities.

FHRMs have not been provided in any of the FRMPs. Instead links to maps have been provided in all three FRMPs (even in the EE3 FRMP, although no APSFRs were designated there). Specifically, the FRMPs provide the link (URL) of the Ministry of the Environment, which leads to direct links of the FHRMs (the maps are visible on the GIS application operated by the Estonian Land Board)¹⁴. The link to the location of the FHRMs provided in all of the FRMPs is:

- <http://www.envir.ee/et/uleujutusohupiirkonna-ja-uleujutusohuga-seotud-riskipiirkonna-kaardid>

¹² FRMP: EE2 page 11-12.

¹³ FRMP: EE1 page 15; FRMP: EE2 page 13; FRMP: EE3 page 11.

¹⁴ FRMP: EE1 page 15, 16, 18; FRMP: EE2 page 13, 14, 15; FRMP: EE3 page 11.

2.2.1 Maps for shared flood risk areas

As no cross-border flood risk areas were identified, cross-border FHRMs were not prepared for any of Estonia's UoMs¹⁵.

2.2.2 Conclusions drawn from the flood hazard and flood risk maps

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

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

Details on how the FHRMs were used to develop FRMPs are rather limited, general and scattered in the reporting sheets and the FRMPs. In general, all FRMPs refer in a standard text to the development of the FRMPs and its measures on the basis of FHRMs. For example: the development of the measures in the EE1 FRMP was based on the FHRMs, and the flood hazard maps were based on flood probability scenarios. Flood risk maps describe potential adverse effects (associated with population, economic activities, wastewater treatment plants etc.) together with these scenarios. In addition, the FRMPs and the reporting sheets mention that interested parties and the public were involved in the preparation of the FHRMs. Specific objectives on flood risk reduction have been set based on the pre-defined risk factors in major flood risk areas with the help of the FHRMs¹⁶.

2.3 Changes to the APSFRs or other Flood Risk Areas

The FRMP assessment looked for information on changes in the identification of APSFRs since December 2011 or in the FHRMs since December 2013 indicated in the FRMP: no information concerning changes was found in the FRMPs.

¹⁵ Reporting sheets: Summary of Coordination

¹⁶ Reporting sheets: Summary of Objectives; Reporting sheets: Summary of Consultation; FRMP: EE1 pages 18, 41, 43, 54; FRMP: EE2 pages 15, 34, 35, 46; FRMP: EE3 pages 24, 35.

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

The FHRM assessment identified the following areas for further development for Estonia¹⁷:

- For two areas, Järvakandi and Kohtla Järve, maps were not reported.
- It seems that Estonia only reported population at risk for low probability fluvial floods.
- It seems that there were no potentially affected protected areas in the UoMs, apart from public beaches and Natura 2000 sites.
- Climate change was not included in the analysis.

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

- FHRMs have not yet been prepared for the two missing APSFRs, Järvakandi and Kohtla Järve, due to ongoing uncertainties in the determination of flood extents and probabilities¹⁸.
- The FHRMs now include information on population at risk for four probabilities of floods, including 10-year and 50-year floods¹⁹.
- Concerning potentially affected protected areas in the UoMs apart from public beaches and Natura 2000 sites, the FRMPs clarify that the FHRMs also show cultural heritage monuments and other sensitive objects (kindergartens, schools, hospitals, local government buildings, libraries, police stations, rescue stations)²⁰.
- The FHRMs have not been updated to consider climate change, and it is indicated that they will do so for the next cycle.

¹⁷ Based on European Commission, Assessment of Flood Hazard and Flood Risk Maps – Member State Report: EE – Estonia, 2014. Available at:

http://ec.europa.eu/environment/water/flood_risk/pdf/fhrm_reports/EE%20FHRM%20Report.pdf

¹⁸ In both cases, this is due to difficulties in mapping a combination of flood sources: for Järvakandi, floods could result from a combination of spring meltwater accompanied by two other factors: high groundwater and lack of capacity of the rainwater drainage system. For Kohtla-Järve, pluvial floods could be accompanied by problems with the rainwater drainage system.

¹⁹ Estonia argues this has been the case since the maps were first produced and that the relevant information was duly reported to the European Commission.

²⁰ EE1 FRMP p.18 and EE2 FRMP p.15

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

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

- The FRMPs lack a detailed description of how the APSFRs and the FHRMs have been used to prioritise objectives and/or measures. FHRMs have not yet been prepared for two of Estonia's 20 APSFRs (Järvakandi and Kohtla Järve).
- FHRMs are not provided in the body of the FRMPs or as annexes for illustration and completeness, though the plans contain internet links to the maps. In cases of floods from multiple sources, the FRMPs do not indicate clearly how different flood sources and their respective contributions to flood risk have been accounted for.

3. Setting of Objectives

3.1 Focus of objectives²¹

The FRMPs for EE1 and EE2 both set out two general objectives:

1. Protect existing sites from flooding;
2. Ban or restrict construction of new buildings based on the nature of the site.

Since there is no APSFRs identified in EE3, the corresponding FRMP has set out only one general objective: prevent the emergence of any significant flood risk areas.

All three FRMPs contain further objectives, which are linked to measures and expected results. This list, the same in all three FRMPs, has been divided into three groups:

1. Prevention: Prevent the emergence of new flood risk areas (reducing the likelihood of flood risk while taking into account potential climate change projections).
2. Prevention/avoidance:
 - a) Prevent flooding (reducing flood risks in risk areas and thereby the impact of flooding on human health, the natural environment, cultural heritage and economic activity);
 - b) Protect against flooding and control flooding (reducing impacts of flooding via technical measures in buildings and areas in order to protect human health, the environment, cultural heritage and economic activity).
3. Preparedness: Ensure preparedness for flooding (preparing mitigating and preventative measures, including shaping behavioural habits to raise awareness and ensuring technical readiness for temporary protection measures).

The FRMPs for EE1 and EE2 go on to emphasise the importance of specific sites when setting targets and determining activities related to the objectives. The FRMPs state that attention should be paid to sites that may pose significant threat to human life and health, property and/or the natural environment as a result of flooding. Elaboration of rules for construction planning and implementation in flood risk areas should be considered to prevent risks.

Even though the flood risk management objectives defined in Estonia are rather general, it can be concluded that in the FRMPs²²:

²¹ Flood Risk Management Plan for Western Estonia River Basin (EE2) 2016-2021, pages 28-29; Flood Risk Management Plan for Eastern Estonia River Basin (EE1) 2016-2021, pages 22-23; Flood Risk Management Plan in Koiva River Basin (EE3) 2016-2021, pages 12-13.

²² These categories are included in Art. 7 of the Floods Directive.

- The objectives aim to reduce the adverse consequences of floods.
- The objectives aim to reduce the likelihood of flooding²³.
- The objectives refer to measures that will be implemented.
- The objectives refer to non-structural measures²⁴.

3.2 Specific and measurable objectives

In Estonia, the objectives are neither specific nor measurable. Neither the general nor the specific objectives for the FRMPs are specific in terms of what they are trying to achieve, where they are to be achieved, or when they are expected to be achieved.

While in the FRMPs indicators are provided, they are associated to the measures rather than to the objectives.

3.3 Objectives to reduce adverse consequences from floods

The three FRMPs state that objectives are there to reduce or protect against the impact of flooding on human health, the natural environment, cultural heritage and economic activity.

3.4 Objectives to address the reduction of the likelihood of flooding

The objectives include the reduction of likelihood of flooding in flood risk areas (as well as prohibiting the creation of new risk areas).

3.5 Process for setting the objectives

The FRMPs do not clearly outline how the objectives were set. While the FRMPs refer to coordination among government authorities (see section 7), it is not stated if this included the definition of objectives. Nor is information provided if the consultation of private stakeholders or the public encompassed the objectives.

²³ The assessment adopts the generally accepted definition of risk as a product of consequence times likelihood, thereby also in alignment with Art. 7(2) of the FD.

²⁴ Non-structural measures include measures such as flood forecasting and raising awareness of flooding as well as land use planning, economic instruments and insurance.

3.6 Good practices and areas for further development regarding setting objectives

The following **good practice** was identified:

- An FRMP was prepared for the Koiva UoM (EE3) despite the fact no APSFRs were identified in this UoM: its aim is to avoid and minimise risks from future floods and the main focus is on measures for sustaining and improving the natural water retention abilities of the landscape.

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

- The objectives are very broad and are neither specific nor measurable.
- Little information is provided in the FRMPs on the process for setting objectives.

4. Planned measures for the achievement of objectives

In its reporting sheets, Estonia reported 70 aggregated²⁵ measures and no individual measures²⁶. The number of measures per UoM is ranging from 22 (in EE3) to 24 (in EE1 and EE2). All three UoMs contain measures covering the four aspects²⁷: protection; prevention; preparedness; recovery and review.

The majority of the measures are prevention measures (44 measures or around 63% of all measures reported in Estonia) followed by preparedness (20 measures, around 29% of the total). There are three protection and three recovery and review measures, one of each per UoM (each around 4% each of the total): all the protection measures are listed as measure type M31, natural flood management²⁸; all the recovery and review measures are listed as type M53, other recovery²⁹. Please see Tables A1 and A2 and Figures A1 and A2 in Annex A for further detail on the information provided in Estonia's reporting sheets.

The data and numbers provided in the reporting sheets do not provide all the information on measures given in the FRMPs and the Action Plan. The latter documents describe a national approach for defining and structuring measures, organised on three levels:

- At the first level, there are 12 “measure blocks” or “groups” (Meetmeplokid in Estonian) that serve a common target.
- Under these measure groups, 24 measures have been identified: Estonia's reporting sheets provide information at this, second level.
- Under the measures, Estonia's Action Plan identifies 110 actions, each a concrete, specific activity.

Please see Annex A2 for a more detailed overview of this structure.

²⁵ The Reporting Guidance mentions “Measures can be reported as individual measures (recommended for major projects) or aggregated measures,...” and also notes that measures may be comprised of “many individual projects”. European Commission, Guidance for Reporting under the FD (2007/60/EC), 2013, pp. 54-58.

²⁶ The information reported to WISE was the starting point for the assessment in this section. The majority of the statistics presented are based on processing of information reported to WISE. Assuming that the Member States accurately transferred the information contained in their FRMPs to the reporting sheets (the sheets are the same for all Member States and are not customisable) and barring any undetected errors in the transfer of this information to WISE arising from the use of interfacing electronic tools, these statistics should reflect the content of the FRMPs.

²⁷ For details about all measure aspects and measure types, see Annex B.

²⁸ 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.

²⁹ Recovery and Review, Other, Other recovery and review, Lessons learnt from flood events, Insurance policies.

4.1 Cost of measures

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

	Estimated budget for measures/actions (2015-2021) in EUR (construction actions not included)
All UoMs	EUR 289 610

Source: FRMPs

In the each of the three FRMPs, only the total national budget for implementation of the non-construction measures in Estonia is provided: the total cost of the planned measures is EUR 289 610 over a period of 6 years (construction actions are not included). There are no separate budgets for UoMs or APSFRs.

In its reporting sheets, Estonia provides cost estimates for 40 of its 70 measures (57 %): these costs – which refer to the second level of measures – vary between EUR 3 000 and EUR 69 000, with the majority of the measures being in the range EUR 20 000 - 50 000. The costs appear to be evenly distributed across measure aspects and UoMs (for more details see Tables A3 and A4 in Annex A).

The Action Plan provides further detail, specifying cost estimates for 78 % of the actions (the third level of the measure hierarchy). For the remaining 22 % of the actions, costs are listed as unknown or zero (of these 22 %, for approximately 40 % the cost is listed as zero – most of these are administrative actions that are being already implemented and already taken into account in the budgets of the state, local governments or other responsible authority). The highest cost of an action has been identified at approximately EUR 28 000.

The FRMPs describe the methodology for the cost estimates: these are based on the hourly rates of working time of officials and experts of relevant professions. Costs of construction works should be based on the expert opinion of engineers or other competent experts. For construction actions, it is noted that costs will vary according to specific location and conditions and additional studies are needed to plan the actions in detail. The costs of construction actions are usually determined by the known average price range, and is presented as price per unit (per length or area unit of an object). This is the reason why concrete costs of construction works have not been provided in the description of measures.

The Action Plan identifies 65 out of the 110 individual actions as “obligatory” in that they are required and implemented under existing legislation or programmes; the other 45 actions are identified as “supportive/mitigating”. In particular, the costs for many obligatory measures are set to zero as they are related to ongoing obligations and implementation processes, like

described above (38 actions out of 65, for example, 59 % of obligatory measures have a value “0”).

The costs are presented for administrative, research and advisory actions of measures and mainly for these actions that are not obligatory. Time required for the operations has also been taken into consideration in the calculations of costs, and is based on expert opinion. The FRMPs do not describe any differences in the calculation methods of costs for different types of measures (prevention, protection, preparedness).

4.2 Funding of measures

According to the FRMPs and the Action Plan, measures are being financed from the state budget, local government budgets, European Union and private sector funds, depending on which organisation or body is responsible. Existing and potential sources of funding are identified for each measure (the FRMPs note that potential sources can change)³⁰.

Table 7 *Funding of measures*

	All UoMs assessed
Distribution of costs among those groups affected by flooding	
Use of public budget (national level)	✓
Use of public budget (regional level)	✓
Use of public budget (local level)	✓
Private investment	✓
EU funds (generic)	✓
EU Structural funds	✓
EU Solidarity Fund	
EU Cohesion funds	✓
EU CAP funds	✓
International funds	

Source: FRMPs

4.3 Measurable and specific (including location) measures

The Action Plan provides information on the description of each action, its location (the APSFR or the UoM as a whole) and the responsible authorities. For many but not all actions, a completion date is provided.

Consequently, for all measures and actions across the three UoMs, the planning documents provide a clear description of the measures and actions with regard to:

³⁰ FRMP: EE1 page 48; FRMP: EE2 page 40; FRMP: EE3 page 28: Action Plan 2016-2021 (xls)

- What they are trying to achieve,
- Where they are to be achieved,
- How they are to be achieved.

The planning documents do not, however, always provide clear information on:

- By when the measures and actions are expected to be achieved.

As noted above, the measures and actions indicate the following levels of location:

Table 8 *Location of measures*

	All UoMs
International	
National	
RBD/UoM	✓
Sub-basin	
APSFRR or other specific risk area	✓
Water body level	

Source: Reporting sheet and FRMPs

The location of the measures and their actions is in most cases the relevant APSFR, but in some cases the whole UoM is designated: this is for actions in EE3, in particular³¹.

4.4 Measures and objectives

It is not clear how measures will contribute to the achievement of objectives, nor clear by how much they will contribute. It is also not clear whether the objectives will be achieved when all measures are completed. The expected impacts are not described in the related Action Plan and FRMPs and no numerical indicators have been proposed, therefore the actions' impacts are not quantifiable. In the FRMPs quite detailed descriptions of actions for achieving the objectives are given in table format, but there are no measurable indicators identified for evaluating their progress.

On the other hand, the objectives in the Action Plan are actually equivalent to the aspects of measures (prevention, preparedness etc). For these reasons, it is not possible (based on the

³¹ FRMP: EE1 page 44; FRMP: EE2 page 36; FRMP: EE3 page 25; Action Plan 2016-2021 (xls)

FRMPs and the Action Plan) to assess progress of the implementation of the management plan against its objectives³².

4.5 Geographic coverage/scale of measures

As noted above, the Action Plan identifies the location of actions: this is either the UoM or the APSFR level (the latter is designated only for actions in EE1 and EE2, the West-Estonian and East-Estonian UoMs, respectively)³³.

The Action Plan identifies the geographic coverage of actions at either UoM or at APSFR level for many measures in EE1 and EE2³⁴.

4.6 Prioritisation of measures

In the reporting sheets, Estonia indicated the priority of all measures: 83% of all the measures are categorised as high priority (measures of all aspects are classified at this level of priority) and the remaining 17 % as moderate priority (only prevention measures). No measures are categorised in the other three categories for reporting: critical, very high or low priority. All UoMs have basically the same proportion (ranging 82-83%) of high priority measures compared to moderate priority measures (for details see Tables A5 and A6 in Annex A).

Estonia's FRMPs and Action Plan provide more detailed information at the level of actions, but also present a different scale of priority: there are three levels – high, moderate, and low priority and, in addition to those three main levels, “risk area specific”, meaning that the priority can only be estimated on at risk area level. Most but not all actions are assigned a main level of priority: however, some actions are designated as “risk area specific”. Out of the total of 44 construction actions, 18 are identified as “obligatory” and their priority is set as “high”. The remaining 26 construction actions are set as “supportive/mitigating” and for the majority of these, their level of priority is set as “risk area specific” – only one of the “supportive/mitigating” construction actions has high priority and two have no priority (not relevant in certain APSFR). This information in the Action Plan is in contrast with the text of FRMPs, where it is stated that the priority of construction actions was not evaluated in the preparation of the FRMPs, as it may vary from location to location.

According to the FRMPs, the prioritisation of actions associated to the measures has used the following principles:

³² FRMP: EE1 page 28; FRMP: EE2 page 22; FRMP: EE3 page 12; FRMP, EE2, pages 28-29, 45-50 Action Plan 2016-2021 (xls)

³³ In its reporting sheets, however, Estonia indicated the location of all measures and their actions as the respective UoM.

³⁴ In its reporting sheets, however, Estonia indicated the geographic coverage for all measures as the UoM.

- 1) All actions based on legal acts and other actions that are already being implemented are automatically considered as of high priority.
- 2) Priority assessment for non-technical mitigating actions is carried out at operational level, i.e. either at APSFR or UoM level depending on the action. The priority level depends on the relevance of the action in the area concerned. The relevance is defined by control questions:
 - a. Does the action directly help to save people's lives, protect human health?
 - b. Does the action directly contribute to the prevention of flood risk in densely populated areas?
 - c. Is the action an important study/research whose output is important for the further implementation of other actions?
- 3) For construction actions, priority is assessed by taking into account CBA, in order to avoid excessive costs of high priority construction actions. For construction actions, the ability of the action in mitigating the negative effects of flooding has been taken into account in particular. The prioritisation is carried out locally³⁵.

According to the reporting sheets, Estonia reported information about the timetable of all measures, but not all answers referred to a period of time and it was thus not possible to meaningfully aggregate the information.

In the FRMPs, completion dates are indicated for 46 out of 110 actions. The completion date for one administrative action has been set to be 2016. For the majority (27 actions out of the 46, 59 %) the completion date is as 2018. For 18 actions (39 %), the completion date is 2021. For the actions where no completion date is indicated, some information is provided, such as: “continuous implementation”, or “according to the situation” or “when preparing comprehensive, detailed or other plans”.

4.7 Authorities responsible for implementation of measures

The Action Plan states that the Ministry of the Environment and the Ministry of the Interior Affairs, in co-operation with other ministries and local municipalities, will co-ordinate the identification of responsible authorities.

The FRMPs indicate that most measures and actions have more than one responsible authority. For each action, there will be a main authority directly responsible for the implementation of an action and for many, there will be additional authorities that support the main one. According to the Action Plan, in most cases the main authority is either at national

³⁵ FRMP: EE1 pages 50-51; FRMP: EE2 page 42; FRMP: EE3 page 31.

level – a Ministry or a public authority under a Ministry – or at municipal level. In few cases the implementing authority is the owner. As examples:

- Local municipalities are responsible for actions related to construction or restoration of public water supply systems, spatial planning, obligations and activities under the Building Act.
- For actions for the implementation of the operational programme for preparedness to emergency situations, each local municipality will be the main authority and the Rescue Board (a national body that coordinates of emergency work and response, including for fires, floods and snow storms³⁶) will be the additional authority.
- For actions for natural water retention measures such as buffer strips, in most cases the local municipality is the main authority and the land owner is the additional authority.
- The Environmental Inspectorate is the main authority for actions related to supervision of protection of environment and consequently for supervision of actions to address pollution risks from industrial plants and agriculture during floods. The Technical Supervision Board (which develops and enforces technical safety regulations³⁷) is named as the additional authority for an action to oversee the storage conditions of chemicals and related licences.
- The Health Board is the main authority for a mapping action to establish and periodically update a list of enterprises in each APSFR that use, process or produce hazardous chemicals. The Environmental Board is the authority that supports this action.

4.8 Progress of implementation of measures

According to the reporting sheets, Estonia reported the progress of all measures as ‘progress ongoing’. While the FRMPs and the Action Plan do not provide detail about the status of measures and actions, the Action Plan indicates that 23 actions out of the 110 are continuous.

4.9 Measures taken under other Community Acts

Member States have been asked to report on other Community Acts under which each measure has been implemented: however, Estonia did not provide information on this.

4.10 Specific groups of measures

In all three FRMPs, it is stated that FRMPs take into account **spatial planning and land use**. Indeed, the first “measure group” defined in the Estonian FRMPs involves 'limiting the founding and construction of new objects in flood risk areas' and includes (at the second level)

³⁶ <https://www.rescue.ee/>

³⁷ <https://www.tja.ee/en>

measures for 'planning with consideration of flood risk and natural water retention measures' and 'defining areas with building ban, establishing conditions for buildings in densely populated areas at flood risk, and ensuring water resistance in other flood risk areas'³⁸.

The FRMPs do not provide information if the framework of halting or controlling buildings/development in floodplains evolved since 2000.

Natural water retention measures (NWRMs) have been planned in all three FRMPs. NWRMs and their use are generally described in the FRMPs, although their actions are defined and listed more explicitly only in the Action Plan. The following NWRM measures have been identified under the “measure block” defined as 'Rainwater dispersion and implementation of natural water retention measures to improve ground infiltration':

- The implementation of NWRMs in densely populated areas to disperse rainwater and improve infiltration (the actions under this measure include building green roofs, rainwater harvesting, creation of infiltration trenches and basins, restoring and creating wetlands and improving water retention abilities of drainage systems);
- The implementation of NWRMs in agricultural lands to disperse rainwater and improve infiltration;
- The implementation of NWRMs in forest lands to disperse rainwater and improve infiltration;
- The implementation of natural hydromorphology water retention measures to disperse rainwater and improve infiltration;
- Maintenance of land improvement systems in order to ensure drainage of excess water.

In the Action Plan an action for re-meandering and reconnection of oxbow lakes and similar features is described and evaluated.

Measures that specifically consider nature conservation. All three FRMPs make a brief reference that they take into account all relevant aspects, including nature protection aspects. The Action Plan refers in a generic manner to biodiversity³⁹. However, further details are not available.

³⁸ FRMP: EE1 page 10, 41; FRMP: EE2 page 34; FRMP: EE3 page 24; Action Plan 2016-2021 (xls)

³⁹ FRMP: EE1 page 10; FRMP: EE2 page 9; FRMP: EE3 page 8; Action Plan 2016-2021 (xls)

All three FRMPs make a brief reference that they take into consideration **navigation and port infrastructure**. There is a specific action for the prevention of flood-related pollution originating from ports⁴⁰.

The FRMPs also refer to measures for **dredging** to increase the river channel capacity and its ability to convey water for flood alleviation purposes. All three FRMPs mention dredging as a possible action in the second measure block, under a measure for “The implementation of natural hydromorphology water retention measure to disperse rainwater and improve infiltration”. The Action Plan includes actions presented for better maintenance of drainage systems (e.g. dredging and removal of sediment and vegetation from water bodies in order to ensure better water flow in rivers). Dredging and cleaning of drainage systems in agricultural and forest areas is considered to be an obligatory action, while removal of sediment and vegetation from natural water bodies needs impact and efficiency evaluations prior to implementation⁴¹.

4.11 Recovery from and resilience to flooding

No reference has been found in the FRMPs to insurance policies as a measure. Nevertheless, a rather brief a reference was found in the Action Plan under the measure of 'Ensuring the safety of the population during and after the flood' where the following specific action has been described: Flood relief (e.g. recovery and/or improvement of temporary protection facilities, street restoration, garbage disposal, etc.). It is stated that the action must be taken after every flood. Under possible funding sources, insurance companies are included (along with state budget and owners)⁴².

4.12 Monitoring progress in implementing the FRMP

There is no information provided in the FRMPs or their annexes how implementation of the planned measures will be monitored. However, the reporting sheets state that activities are planned to monitor the effectiveness of measures, and in the middle of the FRMP cycle, local authorities will provide feedback on the implementation of the plan. No further details are provided as to the specific timing or the activities to be carried out⁴³.

Based on the FRMPs (including their annexes) no information has been provided whether a baseline has been established against which progress will be monitored and assessed.

⁴⁰ FRMP: EE1 page 10; FRMP: EE2 page 9; FRMP: EE3 page 8.

⁴¹ FRMP: EE1 page 28; FRMP: EE2 page 22; FRMP: EE3 page 13; Action Plan 2016-2021 (xls)

⁴² Action Plan 2016-2021 (xls)

⁴³ Reporting sheets: Summary of the Progress

4.13 Coordination with the Water Framework Directive

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

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

	All UoMs assessed
Integration of FRMPs and RBMPs into a single plan	
Joint consultation of draft FRMPs and RBMPs	✓
Coordination between authorities responsible for developing FRMPs and RBMPs	✓
Coordination with the environmental objectives in Art. 4 of the WFD	✓
The objectives of the Floods Directive were considered in the preparation of the RBMPs ^a	✓
Planning of win-win and no-regret measures in FRMPs	
The RBMP PoM includes win-win measures in terms of achieving the objectives of the WFD and Floods Directive, drought management and NWRMs ^a	✓
Permitting or consenting of flood risk activities (e.g. dredging, flood defence maintenance or construction) requires prior consideration of WFD objectives and RBMPs	
Natural water retention and green infrastructure measures have been included	✓
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 ^a	
The use of sustainable drainage systems, such as the construction of wetland and porous pavements, have been considered to reduce urban flooding and also to contribute to the achievement of WFD Environmental Objectives	

Notes: ^a based on reporting under the WFD

The FRMPs state that the parallel preparation of the FRMPs and RBMPs makes it possible to harmonise and synchronise planning of measures and to address potential conflicts.

Coordination included consultation with the Commission for River Basin Management, which brings together government bodies, national experts and water service companies for coordination on the implementation of the WFD and RBMPs: consultation with the Commission included the definition of measures and actions. The FRMPs were also prepared together with the second RBMPs in corresponding RBDs/UoMs and the Ministry of Environment is the main competent authority for both.

In addition, the FRMPs include NWRMs that can support the objectives of the WFD (see further description above).

Furthermore, the Action Plan indicates, for each FRMP action, whether it supports the objectives of the RBMP, is neutral or is in conflict with the objectives of the RBMP. Supportive actions are primarily those that preserve the natural environment, such as NWRMs and related work, e.g. to assess the effectiveness of NWRMs. Neutral actions are primarily related to life, health and property. Construction-engineering actions are marked as conflicting.

Although, the Action Plan describes actions targeted at flood risk management and assesses their compatibility with the RBMPs, it does not explicitly explain whether WFD objectives have been taken into account in the development of the FRMP measures and actions⁴⁴.

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

The following **good practices** were identified:

- The Action Plan provides details on measures and actions: their location and responsible authorities and, for some, information on costs and deadlines. Many of the actions are specific and measurable.
- Most actions have been prioritised at the level of UoMs and APSFRs. The methodology for prioritisation has been described in the FRMPs.
- The FRMPs and the Action Plan include measures and actions for sustainable land use and for implementing NWRMs.
- The preparation of the FRMPs was coordinated with the preparation of the second RBMPs under the WFD via consultation with the Commission for River Basin Management on measures and actions. Moreover, the Ministry of Environment was the main competent authority for both documents.
- The Action Plan assesses each action for its compatibility with the RBMP.
- A measure for preventing post-flood pollution has been proposed

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

- While some cost information is provided, it was not been broken down per UoM. Cost information has not been provided for construction measures.

⁴⁴ FRMP: EE1 page 7-8, 41, 54; FRMP: EE2 page 7-8, 34, 46; FRMP: EE3 page 6-7, 24, 35; Action Plan 2016-2021 (xls).

- Since the defined objectives are rather generic and not measurable, it is not clear how and by how much the measures and their actions will contribute to the achievement of objectives, nor is it clear whether the objectives will be achieved when all the measures are completed.
- No indicators for evaluating the impact and progress of measures and actions are described, and no baseline is established.
- There is no description in the FRMPs or Action Plan how the progress and impact of the measures and actions will be monitored.
- The FRMPs and Estonia's reporting sheets do not provide information about links of the measures and actions to other Community Acts.

5. Consideration of climate change

Estonia's FRMPs each include a chapter dedicated to climate change and how its impact is taken into account, including at the PFRA stage. The chapters identify documents that have assessed the impact of climate change to flooding and aquatic ecosystems in Estonia.

The climate-sensitivity of individual actions was assessed (see section 4 and Annex A2 on Estonia's structure of measure groups, measures and actions), and priority should be given to actions that are more flexible and adaptable to a changing climate (i.e. less climate sensitive). The results of the climate-sensitivity tests are presented in the Action Plan: each action is rated as either low, average or high.

The FRMPs note that climate sensitivity was assessed more thoroughly for construction actions. Research, administrative and advisory actions may be affected by projected climate change, but in the analysis these actions (and their results) are considered as low-climate-sensitive actions, due to their short-term nature⁴⁵. Actions assessed with a high category of climate sensitivity include: improving flood protection of existing sewage treatment plants by constructing protective walls or elevating the surface in areas prone to flooding, improving protection of drinking water systems (wells and bore wells, pumping stations, water pipes) from flooding and addressing pollution risks to drinking water during flood events. In addition, NWRMs are usually categorised as of high climate sensitivity, as they are considered long-term actions in the FRMPs. Accordingly, that means their implementation requires consideration of projected climate change until their active lifespan is over (until the year 2100). In general, it is explained that actions which are recommended or assigned a long-term implementation period are usually associated with high climate sensitivity⁴⁶.

Actions for spatial planning and land use are generally categorized as of average climate sensitivity, meaning that mostly they should not be directly affected by climate change, though indirect impacts may occur⁴⁷.

While the measures were assessed in terms of their climate sensitivity, it does not appear that any measures are taken specifically to address the impacts of climate change. The FRMPs refer to the national Climate Change Adaption Strategy but note that the Draft Implementation Plan of the Climate Change Adaption Strategy was planned to be ready in 2016. The Implementation Plan was completed and approved in 2017, and it includes measures specifically to address flood risk in the face of climate change – measures additional to those

⁴⁵ FRMP: EE1 page 30, 35, 36; FRMP: EE2 page 24, 28, 29; FRMP: EE3 page 14, 18-20.

⁴⁶ Action Plan 2016-2021 (xls)

⁴⁷ Action Plan 2016-2021 (xls)

in the FRMPs and Action Plan. The results of the Implementation Plan will be taken into account in the second cycle of the implementation of Floods Directive⁴⁸.

Concerning the timeframes of the climate change scenarios, climate change projections have been made for both short and long term (2030 and 2100). It is stated that with the help of the probability scenarios considered in the FHRMs and the climatic forecasts it will be possible to assure the corresponding actions to be as effective as possible in the future. It is emphasised that it will be necessary to take into account the long expected lifespan of construction actions⁴⁹.

The FRMPs include brief notes about changes in intensity and frequency of flood events as a consequence of climate change: they state that no major change in frequency is expected for flood events with potentially significant adverse impacts⁵⁰.

5.1 Good practices and areas for further development concerning climate change

The following **good practices** were identified:

- Climate change was addressed in the development of the FRMPs and the Action Plan: most importantly, the sensitivity of all actions to potential climate change was assessed. The methodology for this assessment is presented in the FRMPs.

⁴⁸ FRMP: EE1 page 30; FRMP: EE2 page 24; FRMP: EE3 page 14.

⁴⁹ FRMP: EE1 page 37; FRMP: EE2 page 30; FRMP: EE3 page 20.

⁵⁰ FRMP EE1, EE2, EE3. Action Plan 2016-2021 (xls)

6. Cost-benefit analysis

In the Action Plan, 44 actions out of 110 are totally or partially devoted to construction and engineering activities. Estonia's FRMPs state that CBA was used in the prioritisation process of actions, specifically for construction and engineering actions, including both grey infrastructure and green infrastructure (NWRMs). It is stated that this is done in order to avoid excessive costs. The FRMPs mention that the cost/benefit based priority assessments are carried out at the local level, but neither the methodology nor the results of the assessments are presented in the FRMPs. The FRMPs state that the costs of construction and engineering actions are site and facility-specific. For this reason, the FRMPs state that an additional, more detailed analysis on their costs should be carried out. This indicates that the CBA results may need to be revised.

The FRMPs also state that the costs of other actions – such as actions associated with administrative activities, research and studies – are evaluated based on consideration of resources and time needed to complete the actions, but do not report details about the methodologies for these evaluations.

Based on the available information in the FRMPs and Action Plan, it is not possible to evaluate whether multi-benefits have been taken into account or not in the CBA, nor whether transnational effects have been considered⁵¹.

6.1 Good practices and areas for further development

The following **good practice** was identified:

- Cost benefit analysis is identified as a criterion for the prioritisation of construction actions, including for NWRMs.

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

- The methodology for the CBA has not been described nor the results presented.

⁵¹ FRMP EE1, EE2, EE3; Action Plan 2016-2021 (xls), reporting sheets for EE1, EE2, EE3.

7. Governance including administrative arrangements, public information and consultation

7.1 Competent authorities

Based on Estonia's reporting sheets, FRMPs and Action Plan, the Competent Authorities and Units of Management identified for the Floods Directive have not changed. Documents submitted to the European Commission on the subject have not been updated since 2010.

7.2 Public information and consultation

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

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

	All UoMs assessed
Media (papers, TV, radio)	✓
Internet	✓
Digital social networking	
Printed material	✓
Direct mailing	✓
Invitations to stakeholders	
Local Authorities	✓
Meetings	✓
Public information boards, exhibitions and an online survey	✓

Source: FRMPs

For all three FRMPs assessed, most of the information was provided via internet, in particular via websites of the responsible authorities (primarily the relevant ministries, also county and local governments). Public information boards were also used. Public displays (exhibitions) of the draft FRMPs were organised in county centres (for each FRMP separately, in a location dependent on the UoM it covers). Also, thematic brochures were published and an online awareness survey was carried out to draw attention to the development of the FRMPs. Interested parties were informed by direct mailing. Announcements were made in local and national newspapers⁵².

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

⁵² Reporting sheets: Summary of the Consultation FRMP: EE1 page 54-55; FRMP: EE2 page 46-47; FRMP: EE3 page 35-36.

Table 11 *Methods used for the actual consultation*

	All UoMs assessed
Via Internet	✓
Digital social networking	
Direct invitation	
Exhibitions	✓
Workshops, seminars or conferences	✓
Telephone surveys	
Direct involvement in drafting FRMP	✓
An online awareness survey	✓
Together with other public consultations	✓

Source: FRMPs

Many of the information mechanisms were also used for the consultation itself. The survey covered awareness of how to act in the event of a flood event. It was online for 25 weeks: 273 people responded, and the feedback was used in the preparation of the FRMPs. Draft FRMPs were available for six months, and written feedback and proposals were collected during this process.

The Ministry of the Environment organised public displays (exhibitions) in each of Estonia’s 15 county centres; these also provided the opportunity for the public to ask questions and make proposals.

A total of 25 meetings and workshops were held with interested parties. For example, three public meetings were organised in three locations where it was possible to ask questions and make proposals about all FRMPs as well as the Action Plan, no matter the location of debate. For some of the meetings, the agenda, presentations and lists of participants are available on internet. In the course of some meetings, additional information was requested from local authorities in important risk areas.

Furthermore, the drafts were submitted for review and approval by the national Commission for River Basin Management, which brings together government bodies, national experts and water service companies (see also section 4).

The draft FRMPs were also discussed during the public consultation on the national marine strategy. In addition, the Rescue Board carried out public surveys on public preparedness to emergency events, including also flooding (this was separate to the survey for the FRMP and was not related exclusively to the FRMP process). Information on the FRMPs was specifically included in public consultations on the introduction of national land improvement plans

(which include activities such as digging and maintaining drainage ditches on agriculture and forest land and maintaining estuaries)⁵³.

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

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

	All UoMs assessed
Downloadable	✓
Direct mailing (e-mail)	
Direct mailing (post)	
Paper copies distributed at exhibitions	✓
Paper copies available in municipal buildings (town hall, library etc.)	✓

Source: FRMPs

Documents were available for examination in the public displays in county governments, mentioned above, and in the offices of the Environment Board. Drafts were available via Internet on the website of the Ministry of the Environment and on a dedicated thematic web page, provided by the authors of the FRMPs⁵⁴.

7.3 Active involvement of Stakeholders

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

Table 13 *Groups of stakeholders*

	All UoMs assessed
Civil Protection Authorities such as Government Departments responsible for emergency planning and coordination of response actions	✓
Flood Warning / Defence Authorities	
Drainage Authorities	✓
Emergency services	✓

⁵³ Reporting sheets: Summary of the Consultation FRMP: EE1 page 54-55; FRMP: EE2 page 46-47; FRMP: EE3 page 35-36. National land improvement plans: <http://www.pma.agri.ee/index.php?id=104&sub=355&sub2=424>
Public consultations for introducing land improvement plans (summaries of events): <http://www.pma.agri.ee/docs/pics/VMK%20ja%20maandamiskavade%20avalik%20arutelu%20I%20Tallinn%20230915.pdf> Public correspondence of the Rescue Board, regarding approval of and amendments to FRMPs: <https://adr.rescue.ee/paa/dokument/846820> Surveys about public preparedness on the website of Rescue Board: <https://www.rescue.ee/et/kodanikule/elanikkonnakaitse/haedaolukorraks-valmisolek.html>

⁵⁴ Reporting sheets: Summary of the Consultation FRMP: EE1 page 54-55; FRMP: EE2 page 46-47; FRMP: EE3 pages 35-36

	All UoMs assessed
Water supply and sanitation	
Agriculture / farmers	✓
Hydropower	
Navigation / ports	
Fisheries / aquaculture	
Private business (Industry, Commerce, Services)	
NGOs including nature protection, social issues (e.g. children, housing)	
Consumer Groups	
Local / Regional authorities	✓
Academia / Research Institutions	

Source: FRMPs

As noted above, the FRMPs were reviewed by the Commission for River Basin Management. In addition, the FRMPs specifically mention the participation of several government bodies in their development: the Rescue Board (which among its tasks coordinates inland fire and rescue services), the Agricultural Board (responsible for the planning of land improvement systems) and local authorities are mentioned explicitly in the FRMPs.

Detailed information about the participation and contribution of other interested parties, including private stakeholders and the public, is not provided in the FRMPs or the reporting sheets: for example, the specific stakeholders involved are not identified. Nor do the FRMPs provide a list of comments and proposals received from interested parties during the process, or information on how comments and proposals were addressed⁵⁵

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

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

	All UoMs assessed
Regular exhibitions ⁵⁶	
Establishment of advisory groups	
Involvement in drafting	
Workshops, seminars or conferences	✓
Formation of alliances	

Source: FRMPs

⁵⁵ Reporting Sheets: Summary of the Consultation FRMP: EE1 page 54-55; FRMP: EE2 page 46-47; FRMP: EE3 page 35-36.

⁵⁶ Estonia clarified subsequently that documents were available to the public for examination for a period of 25 weeks in county administration premises.

The main mechanisms for the active involvement of stakeholders were the public meetings and workshops described above⁵⁷.

7.4 Effects of consultation

The FRMPs do not describe the effects of the involvement of various stakeholders – for example, there is no summary of comments received. There is no reference to other documents that could contain this information⁵⁸.

7.5 Strategic Environmental Assessment

The FRMPs do not provide information about an SEA procedure, nor does the Ministry of Environment's website, and no information was found on the web portal for official announcements⁵⁹. On this basis, it appears that an SEA was not carried out.

7.6 Good practices and areas for further development regarding Governance

The following **good practices** were identified:

- Several mechanisms have been used for involving stakeholders. In total, 25 workshops were held to present the FRMPs and gather feedback from stakeholders and the public. A survey was held to gather information on public awareness related to floods, and its results were used in the FRMP. A range of national and local government bodies provided input.
- Consultations on policy activities related to flood risk management, such as the marine strategy and land management, were used to raise awareness and gather input on the FRMPs.
- Coordination with local and national authorities took place via the Commission for River Basin Management as well as direct involvement in the preparation of the FRMPs.

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

- The FRMPs do not provide information on the inputs received during the consultation, nor on changes made in response to inputs from stakeholders or the public.
- It appears that SEAs have not been carried out for any of the FRMPs.

⁵⁷ Reporting Sheets: Summary of the Consultation FRMP: EE1 pages 54-55; FRMP: EE2 pages 46-47; FRMP: EE3 pages 35-36.

⁵⁸ FRMPs EE1, EE2, EE3 - chapter 7. Rescue Board, document registry, correspondence with the Ministry of Environment: <https://adr.rescue.ee/paa/dokument/846820>

⁵⁹ FRMPs EE1, EE2, EE3 Ministry of Environment, Flood risk web site, FRMPs: <http://www.envir.ee/en/floods> Portal for Official Announcements, <https://www.ametlikudteadaanded.ee/avalik/otsing>

Annex A: Supplementary tables and charts on measures

This Annex gives an overview of the data on measures reported by Estonia 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 assessors 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)⁶⁰, not all fields are mandatory, and, as such, not all Member States reported information for all fields.

Some of the fields in the XMLs were 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. In some cases, this resulted in thousands of different answer, or answers given in the national language.

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

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

⁶⁰ <http://icm.eionet.europa.eu/schemas/dir200760ec/resources>

- 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 the example above), are categorised as “no information”.

Types of measures used in reporting

The following table⁶¹ 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’.

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

⁶¹ Guidance for Reporting under the Floods Directive (2007/60/EC):
<https://circabc.europa.eu/w/browse/a3c92123-1013-47ff-b832-16e1caaafc9a>

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Measures overview

Table A1 - Total number of measures

Number of individual measures	0
Number of individual measures including measures which have been allocated to more than one measure type	0
Number of aggregated measures	70
Number of aggregated measures including measures which have been allocated to more than one measure type	70
Total number of measures	70
Total number of measures including measures which have been allocated to more than one measure type	70
Range of number of measures between UoMs including measures which have been allocated to more than one measure type (Min-Max)	22-24
Average number of measures across UoMs including measures which have been allocated to more than one measure type	23

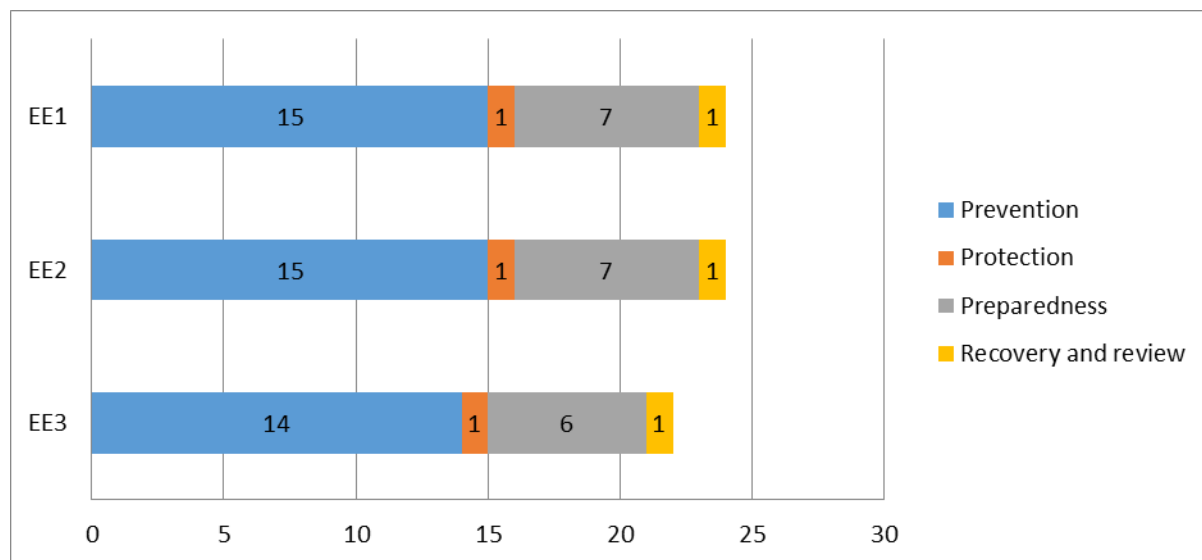
Table A2 - Total number of measures, per measure type and UoM, including duplicates

	Prevention				Total	Protection	Total	Preparedness				Total	Recovery & review	Total	Other	Grand Total
	M21	M22	M23	M24		M31		M41	M42	M43	M44		M53			
EE1	2	1	5	7	15	1	1	1	3	1	2	7	1	1		24
EE2	2	1	5	7	15	1	1	1	3	1	2	7	1	1		24
EE3	2	1	5	6	14	1	1	1	2	1	2	6	1	1		22
Grand Total	6	3	15	20	44	3	3	3	8	3	6	20	3	3	0	70
Average per UoM	2	1	5	7	15	1	1	1	3	1	2	7	1	1	0	23

Note: All measures are aggregated as Estonia did not report any individual measures.

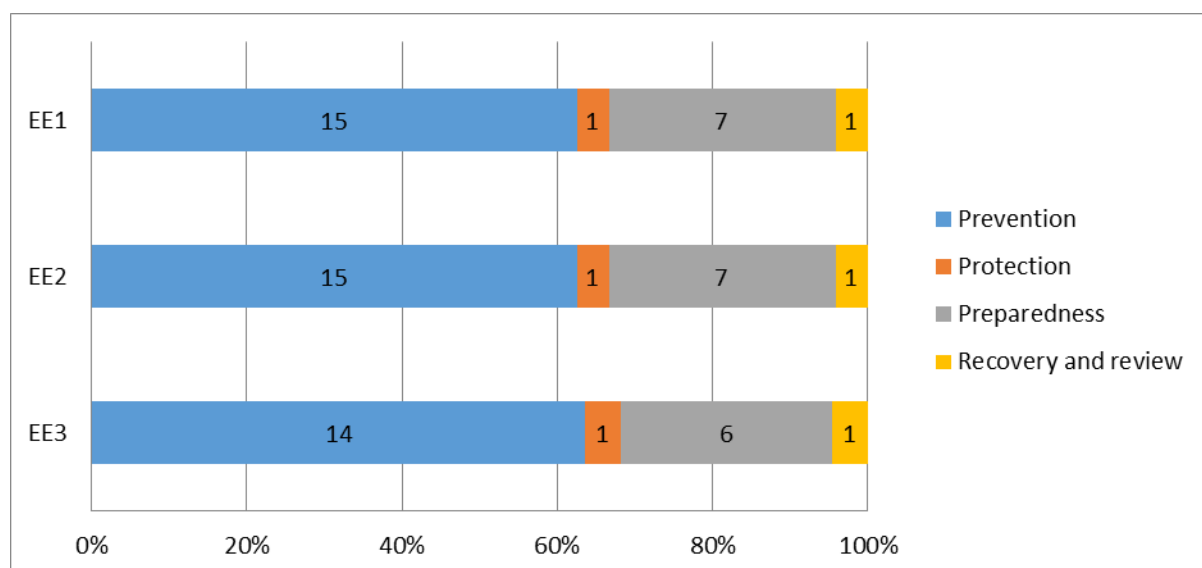
The information in Table A2 is visualised in Figures A1 and A2 below:

Figure A1 - Number of total measures by measure aspect



Note: All measures are aggregated as Estonia did not report any individual measures.

Figure A2 - Share of total measures by measure aspect



Note: All measures are aggregated as Estonia did not report any individual measures.

Measure details: cost

Member States were requested to provide information on:

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

Estonia completed these fields for all measures. The same cost explanation was provided for all measures in the reporting sheets: ‘The costs are for administrative, research and advisory activities. Taken with the Civil Service 2015 document. The resources and time needed for the operation, which is converted into euros, are considered.’

Concerning cost, the highest was around EUR 69 000 (69k) and the lowest was nearly EUR 3 000 (3k). The remaining figures were categorised in the following tables.

Table A3 – Cost by measure aspect (EUR)

	1-5k	5-10k	10-15k	15-20k	20-50k	over 50k	Cost unknown	Grand Total
Prevention	8		3	3	3		27	44
Protection			3					3
Preparedness		2		3	9	3	3	20
Recovery &			3					3
Grand Total	8	2	9	6	12	3	30	70

Figure A3 – Visualisation of Table A3: Cost by measure aspect (EUR)

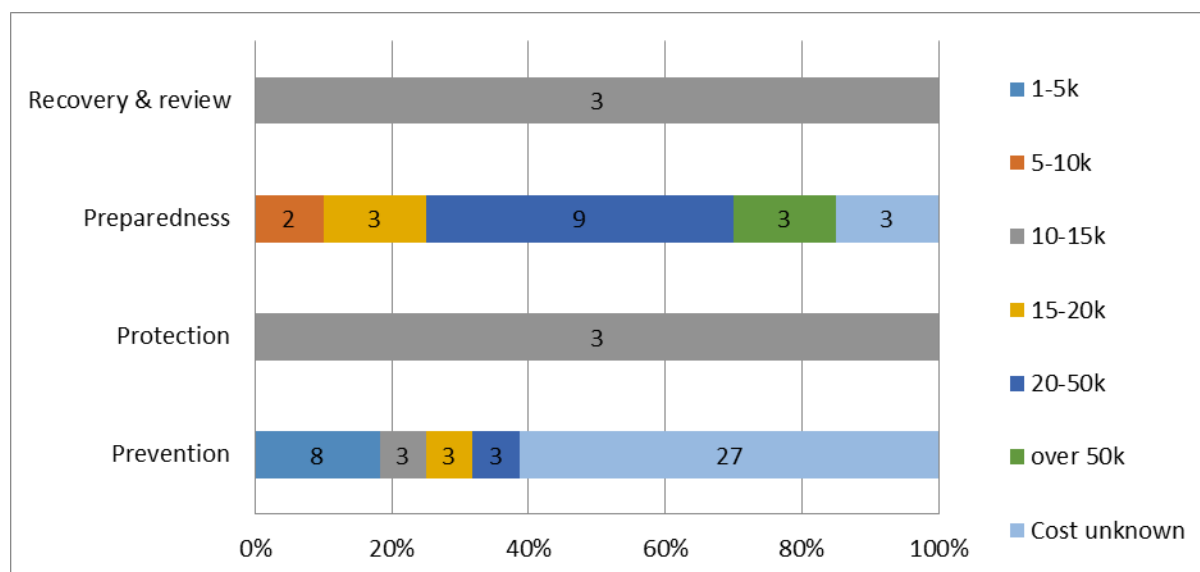
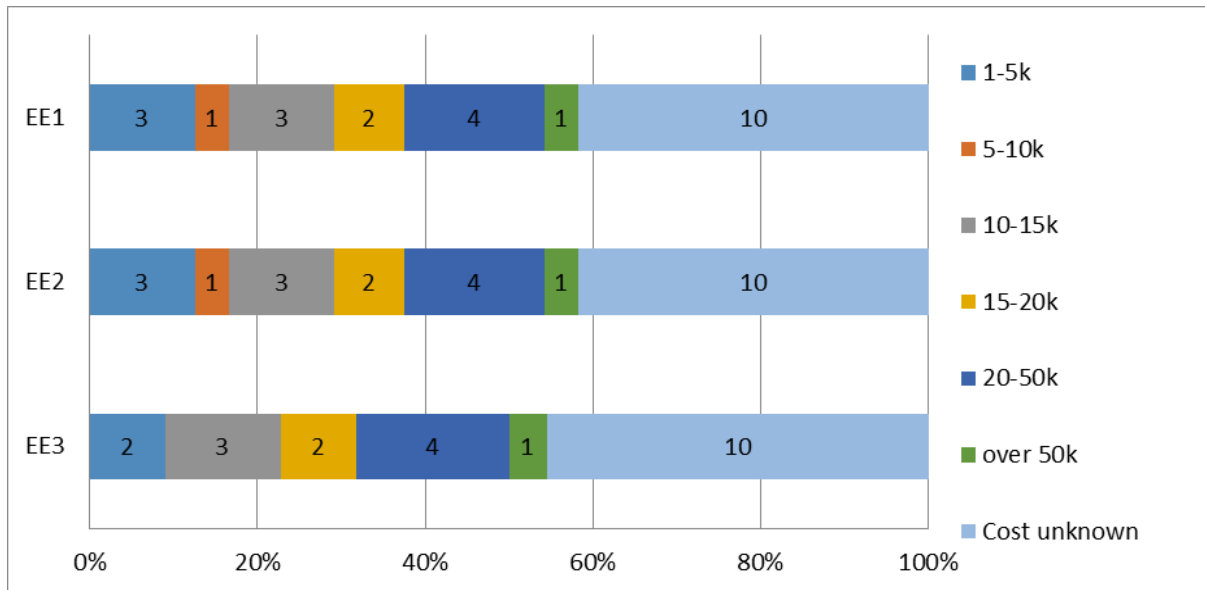


Table A4 – Cost by UoM (EUR)

	1-5k	5-10k	10-15k	15-20k	20-50k	over 50k	Cost unknown	Grand Total
EE1	3	1	3	2	4	1	10	24
EE2	3	1	3	2	4	1	10	24
EE3	2		3	2	4	1	10	22
Grand Total	8	2	9	6	12	3	30	70

Average per UoM	3	1	3	2	4	1	10	23
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Figure A4 – Visualisation of Table A4: Cost by UoM (EUR)



Measure details: name & location

Member States were requested to provide information on:

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

Location of measures

In the reporting sheets, Estonia reported the location of all measures as the respective UoM.

Geographic coverage

Similarly, Estonia reported the same geographic coverage for all measures: ‘RBD/UoM’.

Measure details: objectives

Member States were requested to provide 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

Estonia reported objectives for all measures in the reporting sheets. The objectives were generally ‘preventive’, ‘readiness’ or a combination of the two.

Category of priority

Estonia provided information for the priority of all measures. The following categories are used:

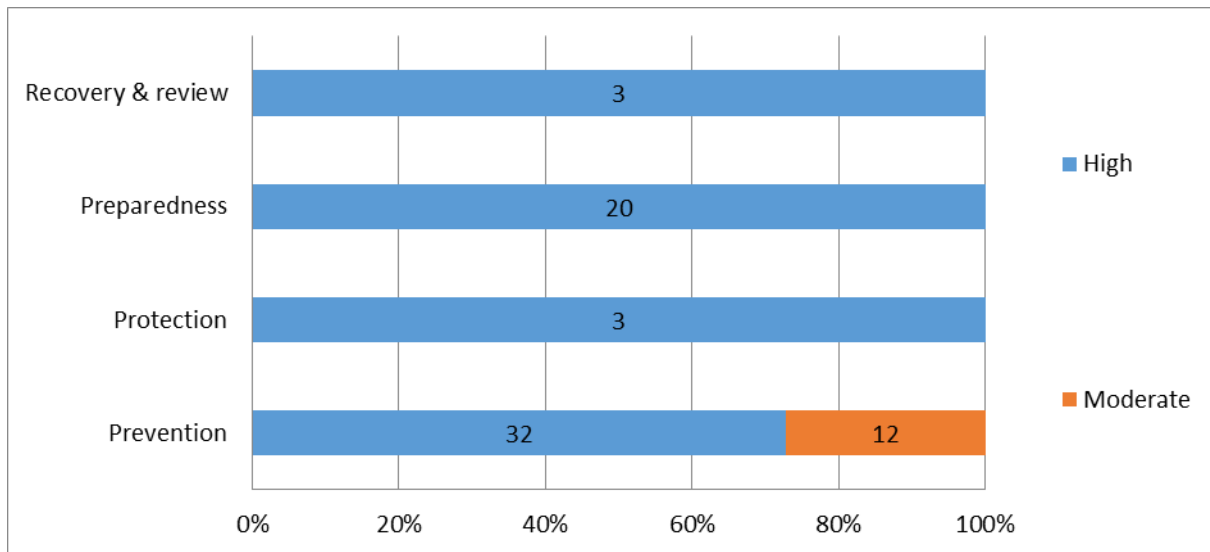
- Critical;
- Very high;
- High;
- Moderate;
- Low.

Table A5 - Category of priority by measure aspect

	High	Moderate	Grand Total
Prevention	32	12	44
Protection	3		3
Preparedness	20		20
Recovery & review	3		3
Grand Total	58	12	70

Note: No measures were categorised as critical, very high or low priority.

Figure A5 - Visualisation of Table A5: Category of priority by measure aspect



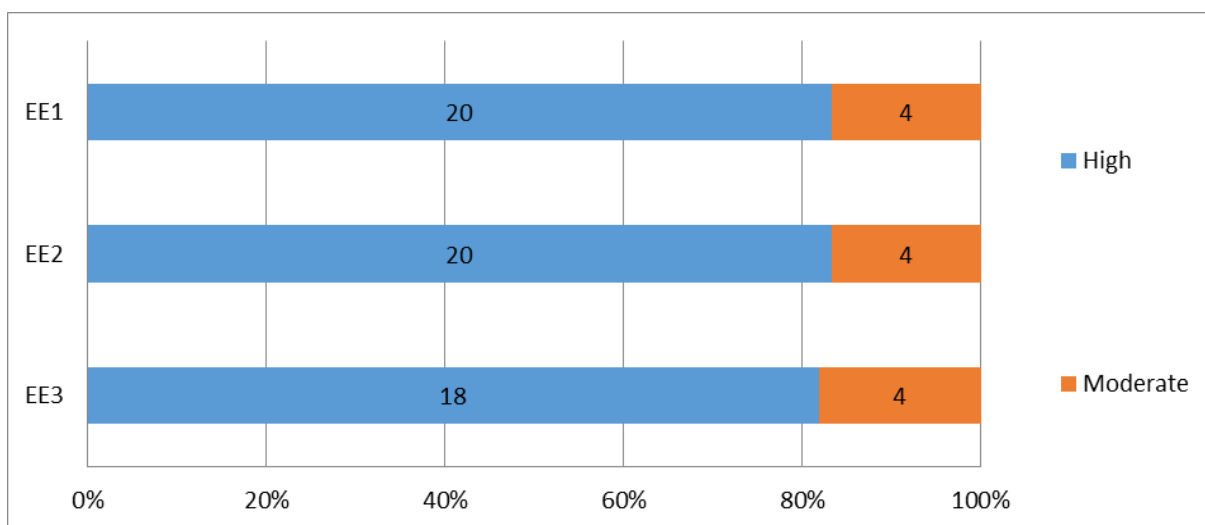
Note: No measures were categorised as critical, very high or low priority.

Table A6 - Category of priority by UoM

	High	Moderate	Grand Total
EE1	20	4	24
EE2	20	4	24
EE3	18	4	22
Grand Total	58	12	70
Average per UoM	19	4	23

Note: No measures were categorised as critical, very high or low priority.

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



Note: No measures were categorised as critical, very high or low priority.

Timetable

Estonia reported information about the timetable of all measures in the reporting sheets. However not all answers referred to a period of time and it was thus not possible to meaningfully aggregate the information.

Measure details: authorities

Member States were requested to provide information on:

- Name of the responsible authority;
- Level of responsibility.

Estonia completed these fields for all measures. However, as this was an open question the responses concerning responsible authority varied greatly and it was not possible to aggregate the information.

The level of responsibility of the relevant actors falls in three categories: national, municipal and owner of the site. However, multiple levels were indicated for single measures leading to some double counting and making the meaningful aggregation of the information impossible.

Measure details: progress

Member States were requested to provide information on:

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

Information about the progress of implementation of the measures was reported as⁶²:

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

⁶² Guidance for Reporting under the Floods Directive (2007/60/EC):
<https://circabc.europa.eu/w/browse/a3c92123-1013-47ff-b832-16e1caaaf9a>

Estonia reported the progress of all measures as ‘progress ongoing’.

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

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

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

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

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

For **measures involving research, investigation or studies**:

- Not started (NS) means the research, investigation or study has not started, i.e. contract has not been signed or there has not been any progress.
- Progress on-going (POG) means the research, investigation or study has been contracted or started and is being developed at the moment.

- On-going construction (OGC): Not applicable
- Completed (COM) means the research, investigation or study has been finalised and has been delivered, i.e. the results or deliverables are available (report, model, etc.).

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

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

Measure details: other

Member States were requested to provide information on:

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

Estonia did not provide information about ‘Other Community Acts’ in the reporting sheets.

Annex A2: Estonia's structure of measure groups, measures and actions

In its FRMPs and Action Plan, Estonia has set out a three-level structure of measure groups, measures and actions.

At the first level, there are **12 Measure groups** (or blocks – *Meetmeplokid* in Estonian):

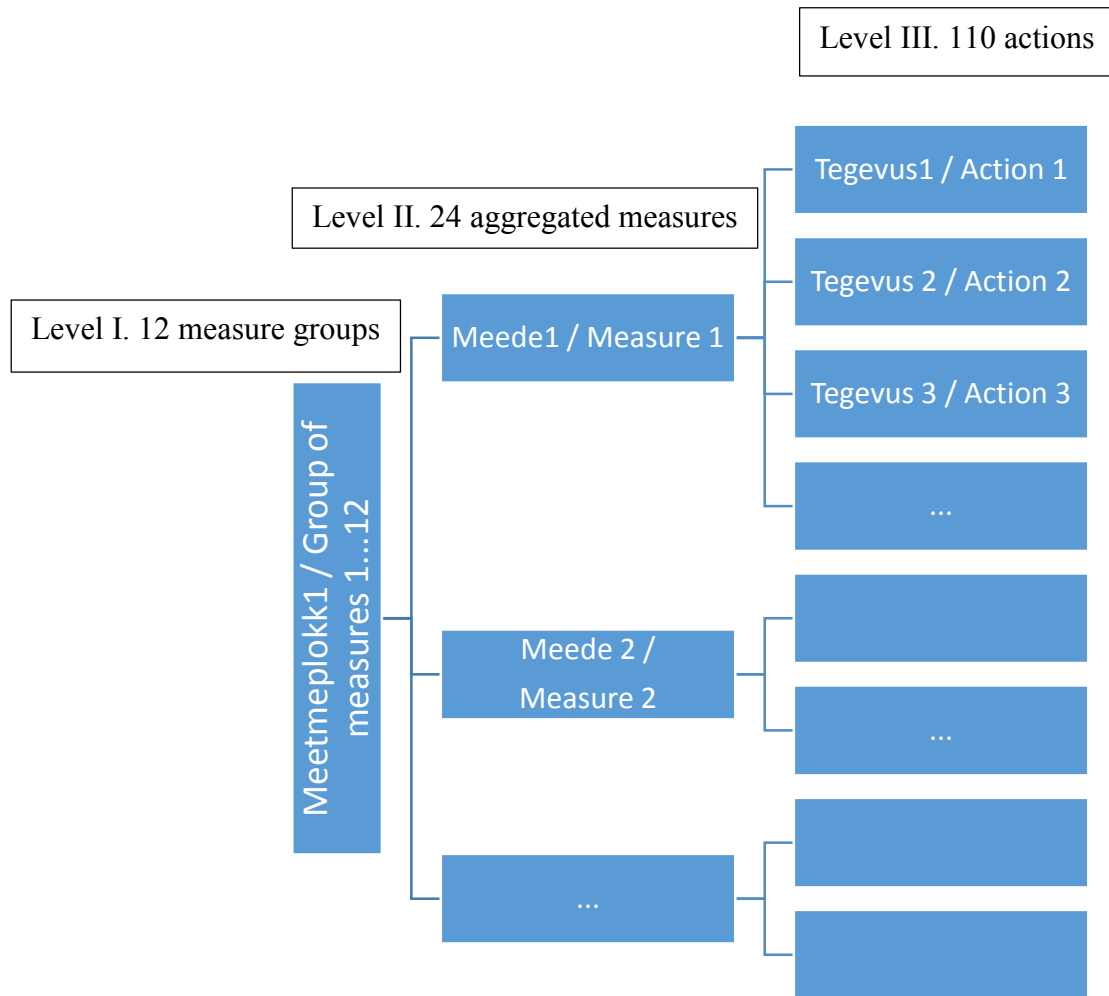
1. Restriction of building new objects in APSFRs
2. Dispersal of rain water and implementing of measures for enhancing natural means for rain water infiltration
3. Ensuring efficient performance of (rain) water collection systems
4. Ensuring good condition of dams
5. Avoiding post-flood pollution
6. Enhancing run-off, lowering the water level and preventing occurrence of high water levels by using constructional activities
7. Ensuring availability and installation of temporary protective barriers for APSFRs
8. Flood forecasts
9. Development and efficiency of evacuation plans
10. Ensuring availability of vital services (emergency medical aid, rescue services, food and water, electricity and transportation).
11. Protection of objects with significance of cultural heritage from potential flood-related hazards
12. Updating risk mitigation action plans

At the second level, there are **24 Measures** (*Meetmed* in Estonian). All 24 are listed for EE1, West Estonian UoM, and EE2, East Estonian UoM; only 22 are listed for EE3, the Koiva UoM (which does not contain APSFRs). This is the level that Estonia has reported to WISE: Estonia reported 70 measures, the sum of the measures in the three UoMs.

At the third level, **110 Actions** (*Tegevused* in Estonian) have been identified.

The approach is hierarchical: the 24 level measures in the Action Plan are each assigned to one of the 12 measure groups. The 110 actions are in turn grouped under the 24 measures. The figure on the next page presents this structure.

Figure A7 – Estonia’s structure of measure groups, measures and actions



Annex B: Definitions of measure types

Table B1 Types of flood risk management measures⁶³

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

⁶³ Guidance for Reporting under the Floods Directive (2007/60/EC):
<https://circabc.europa.eu/w/browse/a3c92123-1013-47ff-b832-16e1caaaf9a>

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

Catalogue of Natural Water Retention Measures (NWRM)

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

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

Source: www.nwrm.eu