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First Flood Risk Management Plans - Member State: Finland

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 report assesses the FRMPs for Finland¹. Its structure follows a common assessment template used for all Member States. The report draws on two main sources:

- Member State reporting to the European Commission on the FRMPs² as per Articles 7 and 15 of the FD: this reporting provides an overview of the plans and details on their measures.
- Selected FRMPs: as 16 FRMPs were prepared in Finland, the assessment has focused on five plans. The FRMPs for assessment were chosen to cover a broad range of Units of Management (UoMs) and geographical conditions, including flood types, as well as plans covered in previous assessments³. The following FRMPs were reviewed:
 - FRMPs covering coastal areas: in FIVHA2, Kymijoki-Gulf of Finland, the FRMP for the Hamina and Kotka coastal area;
 - FRMPs covering inland river catchments: in FIVHA3, Kokemäenjoki-Archipelago Sea-Bothnian Sea, the FRMP for the Kokemäenjoki catchment; in FIVHA4, Oulujoki-Iijoki, the Kalajoki catchment; and in FIVHA5, Kemijoki, the Kemijoki catchment;
 - One international UoM shared with Sweden: FIVHA6 Tornionjoki.

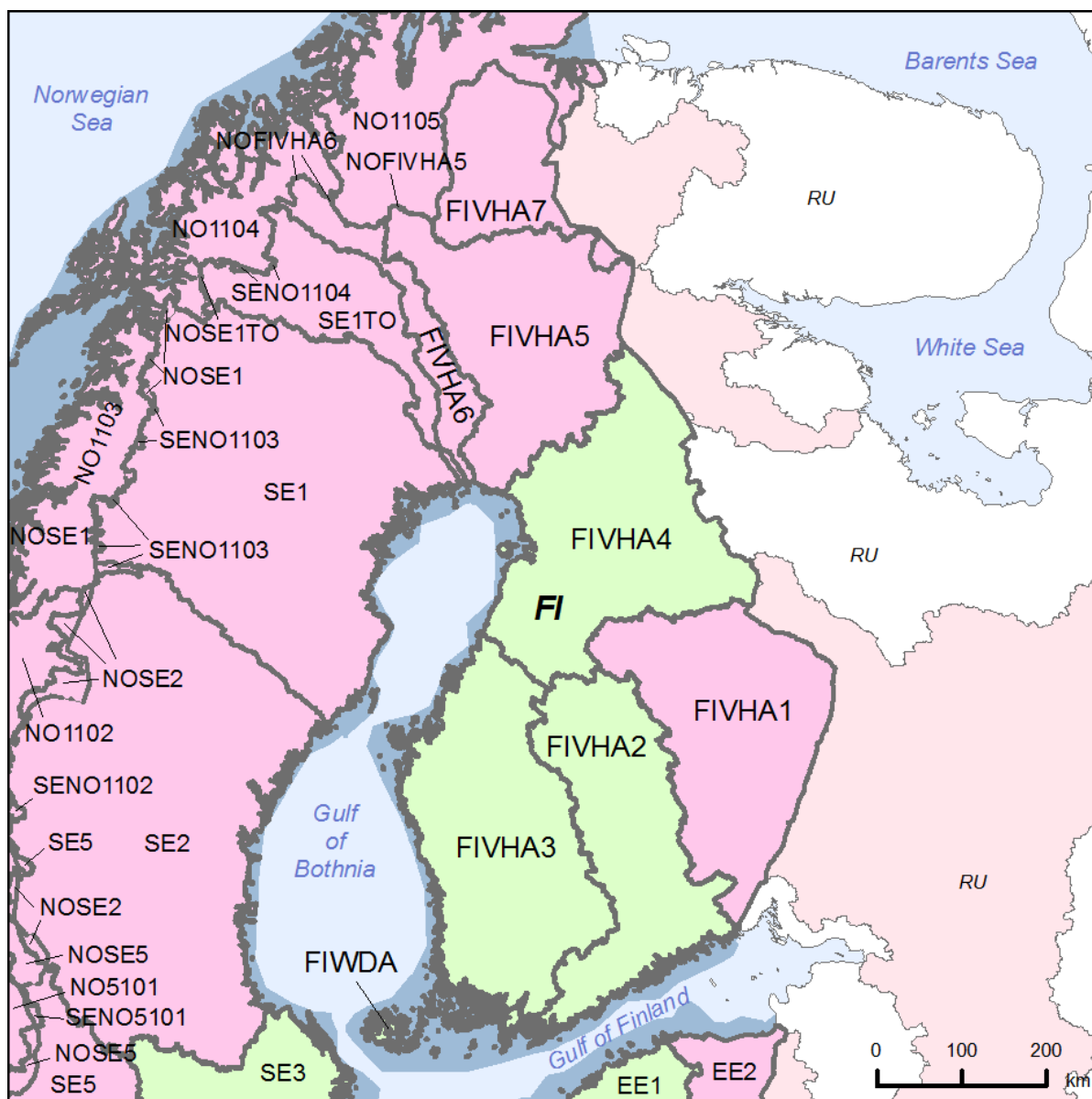
¹ The present Member State assessment reports reflect the situation as reported by each Member State to the Commission in 2016 or 2017 and with reference to FRMPs prepared earlier. The situation in the Member State may have altered since then

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 Finland’s plans follow broadly similar methodologies, so this was not used as a criterion for selection, as in other Member States. Nonetheless, as Finland noted subsequently, the choice of FRMPs can influence the results of the assessment: for example, FRMPs covering coastal areas will not include all measure types (as indicated in section 4, Hamina and Kotka coastal FRMP did not include natural water retention measures, NWRMs).

Overview

Figure 1 Map of Units of Management/River Basin Districts



- International River Basin Districts (within European Union)
- International River Basin Districts (outside European Union)
- National River Basin Districts (within European Union)
- Countries (outside European Union)
- Coastal Waters

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

Finland is divided into eight UoMs, which correspond to the eight river basin districts (RBDs) designated under the Water Framework Directive. Finland, however, reported FRMPs only for six of these UoMs. For the two remaining UoMs (i.e. Åland (FIWDA) and Vuoksi (FIVHA1)), the flood risk assessment process did not result in APSFRs and development of FRMPs was not required. Within the six UoMs with identified APSFRs (21 in total), 16 FRMPs have been

prepared: five in Kymijoki-Gulf of Finland (FIVHA2), six in Kokemäenjoki-Archipelago Sea-Bothnian Sea (FIVHA3), two in Oulujoki-Iijoki (FIVHA4), one in Kemijoki (FIVHA5), one in Tornionjoki (FIVHA6) and one in Ivalojoiki (FIVHA7).

The FRMPs follow a broadly similar approach. The biggest differences are found in the geographic coverage of the FRMPs. Inland FRMPs cover watersheds that include one or several APSFRs, while in coastal areas, the FRMPs cover the exact area of the APSFRs.

The Finnish Ministry of Agriculture and Forestry approved all FRMPs on the 18 December 2015.

The table below gives an overview of all UoMs in Finland, including the UoM code, the name, and the number of APSFRs reported. It also shows if the UoM reported all documents required to the European Environment Agency's (EEA) WISE⁴ – the FRMP as a PDF and the reporting sheet as an XML. The table does not show if hyperlinks to national websites were reported, even if these national websites contain the FRMP.

Table 1 *Overview of UoMs in Finland*

UoM	Name	Number of APSFRs	XML Reported	PDF Reported
FIVHA1	VUOKSI	-	No	No
FIVHA2	KYMIJOKI-GULF OF FINLAND	6	Yes	Yes
FIVHA3	KOKEMÄENJOKI-ARCHIPELAGO SEA – BOTHNIAN SEA	8	Yes	Yes
FIVHA4	OULUJOKI-IIJOKI	2	Yes	Yes
FIVHA5	KEMIJOKI	3	Yes	Yes
FIVHA6	TORNIONJOKI	1	Yes	Yes
FIVHA7	TENO, NÄÄTÄMÖKJOKI AND PAATSJOKI	1	Yes	Yes
FIWDA	ÅLAND	-	No	No
TOTAL		21	6	6

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;

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>

- **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	All five FRMPs assessed include a list of established objectives that relate to reducing flood risk, avoiding adverse consequences of flooding and improving preparedness to flooding.
FRM objectives relate to...		
...the reduction of potential adverse consequences	Strong evidence	This aspect is specified in the definition of objectives in all five FRMPs assessed. The objectives relate to, for example, avoiding and reducing adverse consequences to human health and safety, the environmental and cultural heritage. An important aspect is maintaining vital services within society.
...to the reduction of the likelihood of flooding	Some evidence	Two of the five FRMPs assessed contain objectives that aim to reduce the likelihood of flooding.
...to non-structural initiatives	Strong evidence	This aspect is specified in the definition of objectives in all five FRMPs assessed. Non-structural objectives are related to, for example, increasing public awareness of floods as well as information and warning systems. They are also related to land-use planning, directing site selection of industry and vital services away from flood-risk areas.
FRM objectives consider relevant potential adverse consequences to...		
...human health	Strong evidence	This aspect is specified in the definition of objectives in all five FRMPs assessed. The objectives refer to avoiding damage to human dwellings and maintaining vital services like health services and water supply.
...economic activity	Strong evidence	This aspect is specified in the definition of objectives in all five FRMPs assessed. The

Criterion	Evidence	Comments
		objectives refer to maintaining vital services like electricity and important road and rail connections.
...environment	Strong evidence	This aspect is specified in the definition of objectives in all five FRMPs assessed. The objectives refer to avoiding long-lasting or widespread damage to the environment, for example by directing site selection of industries away from flood risk areas.
...cultural heritage	Strong evidence	This aspect is specified in the definition of objectives in all five FRMPs assessed. The objectives refer to avoiding irreparable damage to cultural heritage.
Measures have been...		
...identified	Strong evidence	All five FRMPs assessed include a set of measures, including ongoing measures and new measures. In total across all FRMPs and UoMs, Finland reported 412 individual measures and no aggregated measures.
...prioritised	Strong evidence	Prioritisation was carried out using multi-criteria decision analysis (MCDA) based on a series of criteria that varied somewhat across the FRMPs assessed. One criterion common to four out of the five FRMPs was the effectiveness to reduce the likelihood of floods and their damaging consequences. Three of the five FRMPs included as criteria achieving the objectives of flood risk management and the costs and benefits of the measures. Two FRMPs assessed included the compatibility of measures with river basin management and with environmental impact assessment in prioritisation. (One FRMP did not specify prioritisation criteria ⁵ .)
Relevant aspects of Article 7 have been taken into account such as...		
...costs & benefits	Strong evidence	All the FRMPs assessment include a description of cost-benefit analysis (CBA) methods used. A CBA was conducted for the

⁵ Finland subsequently clarified that in general MCDA was used, following the same prioritisation principles across the FRMPs.

Criterion	Evidence	Comments
		proposed measures. In practice, CBA was used for flood protection infrastructure measures. For those non-market or continuous measures whose monetary valuation is difficult to estimate, the benefits were assessed via Multi-Criteria Decision Analysis (MCDA).
...flood extent	Strong evidence	The flood extent is described in a specified section of the FRMPs for each APSFR. The description is based on long-term hydrological data, data on dams and regulation of water level, and information on historical flooding. According to the information reported, flood extent has been used to define the measures.
...flood conveyance	Some evidence	Conveyance routes were addressed in the PFRA. Information was not found in the five FRMPs assessed on how flood conveyance was addressed in the measures, though the FRMP of the Kokemäenjoki catchment area (part of FIVHA3) contains two measures that specify dredging, one for a river and another for an estuary, for the purpose of flood conveyance.
...water retention	Strong evidence	Natural water retention measures are included in all FRMPs assessed except the plan for the Hamina and Kotka Coastal area (FIVHA2). The measures include studying the potential of natural retention in the catchment area, promoting wetlands as well as flood meadows or forests in land use planning, and a measure targeted to actors in agriculture and forestry to promote natural water retention capacity.
...environmental objectives of the WFD	Strong evidence	All FRMPs assessed describe in a separate section what effects the planned measures have on the environmental objectives of the WFD. The impact of flood risk management measures on the achievement of water management objectives has been assessed using a five-level scale: very positive, positive, neutral, negative, very negative.
...spatial planning/land use	Strong evidence	All FRMPs assessed include a specific land use planning measure to take floods into account in land use planning. The measure should ensure, for example, that flood risk is taken into

Criterion	Evidence	Comments
		account in new city plans, key services are located outside low probability flood risk areas, and flood risks are taken into account in road and rail projects.
...nature conservation	Some evidence	Although none of the five FRMPs assessed had measures that specifically involved nature conservation, all plans assessed include an analysis of the effects on biodiversity or Natura 2000 in their assessment of measures.
...navigation/port infrastructure	Some evidence	Ports and navigation have been considered in the impact assessment of the measures in one FRMP assessed (Hamina and Kotka FRMP in FIVHA2). In other FRMPs, navigation does not have a significant role ⁶ .
...likely impact of climate change	Some evidence	FRMPs include a systematic assessment of the adaptability of measures to changing climate conditions, but no measures are specifically designed to advance adaptation to the changing climate during this planning period ⁷ .
Coordination with other countries ensured in the RBD/UoM	Strong evidence	The one FRMP assessed (Tornionjoki, FIVHA6) that includes an international border has clearly documented coordination with the Swedish authorities. Flood maps have been prepared together. Both FRMPs have several common objectives and a Swedish organisation is taking part in the work of Tornionjoki flood group.
Coordination ensured with WFD	Strong evidence	All FRMPs assessed have a similar procedure of coordination with the respective River Basin Management Plan (RBMP) under the WFD. The same authority has been responsible for the preparation of both FRMPs and RBMPs, and the consultation processes of these plans have occurred at the same time. The planning principle has been that the measures in one plan should not significantly threaten the objectives and positive impacts of the other

⁶ Finland clarified subsequently that there is no commercial inland waterway traffic except in the Vuoksi river basin, where however no APSFR exists.

⁷ Finland remarked subsequently that climate change adaptation and specific measures are included in other processes, such as the Climate Change Act and the National Strategy for Adaptation. These processes will be described in the second FRMPs.

Criterion	Evidence	Comments
		plan. The impact of flood risk management measures on the achievement of water management objectives has been assessed using a five-level scale.
Active involvement of interested parties	Some evidence	The establishment of flood groups has ensured active involvement of certain parties, but not all flood groups included representatives of NGOs or industry. Stakeholders were also involved in the assessment of measures in workshops.

Good Practices

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

Table 3 *Good practices in the Finnish FRMPs*

Topic area	Good practices identified
Integration of previously reported information in the FRMPs.	Each of the five FRMPs assessed has a chapter on the PFRA and the descriptions in the FRMPs of this process are clear. In the PFRA, additional flood risk areas were identified that were not considered significant; these were, however, included in mapping. The purpose of the flood hazard and risk maps is clearly explained in the FRMPs, and the methodology for PFRA is well described. The FRMPs assessed moreover describe how the FHRMs were used in their preparation.
Setting of objectives for the management of flood risk.	All objectives contain specific and measurable elements: for example, all five FRMPs assessed define clearly the geographic coverage where the objectives are to be achieved (for example, a specific APSFR or the whole catchment area). The objective-setting process was well coordinated both at national and regional levels, and international coordination took place in the Tornionjoki international UoM (FIVHA6); moreover, stakeholders were involved in objective setting.
Planning/implementing of measures and their prioritisation for the achievement of objectives.	All FRMPs assessed had an impact assessment process with a sound method that was used to select the combination of measures. Multi-objective assessment methodology was used, following guidance from the Finnish Environment Institute. All FRMPs assessed contained clear information on the geographic location, timetable and responsibilities related to the planned measures. Three of the five FRMPs assessed the link between measures and objectives.

	<p>The FRMPs include spatial planning measures and national water retention measures (NWRMs).</p> <p>The impact of flood risk management measures on the achievement of water management objectives has been assessed using a five level scale: very positive, positive, neutral, negative and very negative.</p> <p>The FRMPs assessed set out a clear monitoring process for the implementation of measures, based on a national approach.</p>
Consideration of climate change in the FRMPs assessed.	All FRMPs assessed include a systematic assessment of the adaptability of measures to changing climate conditions.
Use of CBA in the FRMPs assessed.	The CBA had a broad scope and accommodated the fact that not all effects can be measured in monetary terms.
Public participation.	<p>In all FRMPs assessed, the public was informed of the different phases of the planning process using different media.</p> <p>The plans were presented in various occasions for the public and for stakeholders in all FRMPs assessed. The work of the “flood groups” was effective in integrating the views of stakeholders in the plans.</p>
Flood risk governance.	All FRMPs assessed underwent a Strategic Environmental Assessment (SEA) procedure, and the SEA hearings were carried out in connection with the hearings of the FRMPs. The SEA reports are included in the FRMPs as annexes.
International issues in flood risk management.	The Finnish-Swedish Transboundary River Commission had an expert member in the flood group and was actively involved in the drafting of the FRMP of Tornionjoki UoM (FIVHA6).

Areas for further development

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

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

Topic area	Areas for further development identified
Setting of objectives for the management of flood risk.	None of the FRMPs set a time frame for the achievement of objectives ⁸ .
Planning/implementation of measures and their prioritisation for the	<p>The FRMPs assessed do not contain an analysis whether the objectives will be met with the planned measures.</p> <p>One FRMP does not specify prioritisation methods or criteria.</p>

⁸ Finland clarified subsequently that the Finnish FRMPs are not binding with regard to the actual implementation of measures. Therefore it is difficult to set timetables for completing the measures, or achieving the objectives. However, a plan with a time frame for meeting the objectives exists and during implementation of measures these will be monitored and cross-checked with the objectives related to the measure in question. More emphasis on how to evaluate achievement of the objectives based on the implementation and effectiveness of the measures will be given in the second cycle.

achievement of objectives.	
Consideration of climate change in the FRMPs assessed.	None of the five FRMPs assessed refer to Finland's national policy documents on adaptation.
Use of CBA in the FRMPs assessed.	CBA was carried out only for flood protection infrastructure measures ⁹ .
Public participation.	Not all FRMPs assessed had involved NGOs, fisheries or industry in an active role in the drafting process; however, not all stakeholders may be relevant in all FRMPs. Nature protection NGOs are included as permanent experts in the Flood Groups of the Kemijoki catchment area (in FIVHA5) and the Tornionjoki UoM (FIVHA6). Certain industry representatives are included in all Flood Groups except in Tornionjoki. Despite there being description of consultation results and statements that the results were taken into account, not all FRMPs included a description of how the consultation results were taken into account in the final drafting of the plan.

Recommendations

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

- To support the assessment of progress, a clear time frame should be set for the achievement of objectives.
- The plans should establish a stronger connection between the objectives and measures. It should be considered whether the planned measures are sufficient to reach the objectives.
- Next to considering climate change as a prioritisation criterion, coordination between the FRMPs and national policy documents on climate change adaptation should be pursued.
- A broader set of interested parties should be actively involved in the preparation of the FRMPs, including for example representatives of nature protection NGOs, fisheries as well as relevant industry. A description of how the consultation results were taken into account in the final drafting of the plan would add to ownership of the Plans.

⁹ Finland noted subsequently that the second cycle of implementation of the FD it will be easier to “monetise measures” for cost information of measures implemented during of first cycle will be available for using. Still, Finland reckons that not all measures will lend themselves to monetising and other types of analyses might be used.

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

1.1 Reporting of the FRMPs

Finland reported 16 FRMPs for six of its eight UoMs (for two UoMs, no FRMPs were reported and were not needed as no APSFRs were designated). Most FRMPs are prepared at sub-UoM level, each covering one or more APSFRs in the sub-UoM/UoM, though one (FIVHA6) covers an entire UoM with one APSFR. Finland did not make use of Art. 13(3) of the Floods Directive, which allows Member States to make use of previous flood risk management plans (provided their content is equivalent to the requirements set out in the Directive).

1.2 Assessment of the FRMPs

The assessment covered five of Finland's 16 FRMPs. In Finland, the basic approach for the preparation of the FRMPs was similar throughout the country, linked to national guidance documents and a national coordination group (which supports the work of regional authorities and flood groups) for flood risk management. Thus, the biggest differences are found in the geographic coverage of the FRMPs. The five FRMPs assessed were selected to cover both river drainage areas and coastal areas, different numbers of APSFRs and an international UoM. The assessment covers the following five FRMPs:

- FRMPs covering coastal areas: in FIVHA2, Kymijoki-Gulf of Finland, the FRMP for the Hamina and Kotka coastal area;
- FRMPs covering river drainage areas: in FIVHA4, Oulujoki-Iijoki, the Kalajoki catchment; in FIVHA5, Kemijoki, the Kemijoki catchment; and in FIVHA3, Kokemäenjoki-Archipelago Sea-Bothnian Sea, the FRMP for the Kokemäenjoki catchment;
- One international UoM shared with Sweden: FIVHA6, Tornionjoki.

The table below lists the FRMPs assessed by UoM in which they are found.

Table 5 *Finnish FRMPs assessed*

UoM code	UoM Name and FRMP assessed
FIVHA2	Kymijoki-Gulf of Finland: Hamina and Kotka coastal area
FIVHA3	Kokemäenjoki-Archipelago Sea-Bothnian Sea: Kokemäenjoki catchment
FIVHA4	Oulujoki-Iijoki: Kalajoki catchment
FIVHA5	Kemijoki: Kemijoki catchment
FIVHA6	Tornionjoki ¹⁰

¹⁰ The FRMP covers the whole area of the UoM within Finland.

2. Integration of previously reported information

2.1 Conclusions drawn from the preliminary flood risk assessment

In all five FRMPs assessed, the conclusions of the PRFA are provided in a textual description and summary maps of the APSFRs are presented in the FRMPs. Moreover, all five FRMPs assessed provide a clear description of the PFRA process. All FRMPs assessed include information on other flood risk areas than the ones defined as APSFRs (these are flood risk areas that were identified in the PFRA but were not judged as significant), but only Kokemäenjoki (part of FIVHA3) and Kalajoki (part of FIVHA4) FRMPs show them on maps. In addition, links to detailed maps of the APSFRs have been provided as URLs in all of the FRMPs assessed.

It appears that conveyance routes were taken into account in the PFRA: the reporting sheets of all FRMPs mention that conveyance routes were considered, but specific details were not provided.

2.1.1 Coordination with neighbouring Member States on shared RBDs/UoMs

The only international UoM analysed in detail is Tornionjoki (FIVHA6), shared with Sweden, with an APSFR shared on both sides of the border. In this catchment, flood maps were elaborated in co-operation with Swedish authorities. In the FRMP summary, it is indicated that the Finnish-Swedish Transboundary River Commission and the Swedish authority MSB (*Swedish Civil Contingencies Agency*) gave their written opinions on the designation of the APSFR. Moreover, in the FRMP it is explained that a joint Interreg IV A project, “Detailed inundation planning in the lower part of Tornio River”, carried out from 2009-2012, estimated flood risk. A specific coordination body was not formed for the FRMP; rather, coordination work was carried out by the authorities of both regions and via the Finnish-Swedish Transboundary River Commission.

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

FHRMs were produced (Kemijoki and Tornionjoki drainage areas) for each APSFR, which were in turn based on the PFRA. The identified risk areas and their limits remained the same.

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

The five FRMPs assessed all include a description of the FHRMs as well as links to the detailed maps. In the inland FRMPs assessed (four of the five), the maps cover fluvial floods. Seawater flood maps are presented for the one coastal area assessed, the Hamina and Kotka coastal area (FIVHA2) (fluvial flood maps were not prepared for this APSFR).

In none of the FRMPs assessed do the FHRMs cover pluvial floods, groundwater floods or floods from no specific sources or more than one source of flooding.

The detailed maps are provided as annexes to the FRMPs. They are either included in the main FRMP file – Hamina and Kotka coastal area FRMP in FIVHA2 and Kokemäenjoki catchment area FRMP (part of FIVHA3) – or available on a webpage as follows:

- Flood hazard and flood risk maps for the whole country are available on a common map service¹¹
- Kalajoki FRMP (part of FIVHA4): fluvial flood hazard maps are available in an annex¹²
- Kemijoki (part of FIVHA5): fluvial flood hazard and risk maps are found in annex 8¹³
- Tornionjoki (FIVHA6): fluvial flood hazard and risk maps are found in Annex 6¹⁴

2.2.1 Maps for shared flood risk areas

The assessment covered one transboundary UoM: FHRMs were prepared for flood risk areas shared with Sweden in the Tornionjoki drainage area (FIVHA6). These maps were elaborated in the above-mentioned Interreg IV A project.

2.2.2 Conclusions drawn from the flood hazard and flood risk maps

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

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

All five FRMPs assessed describe (using common wording) how the maps form the basis for planning, objective setting and planning of measures. The definition of measures was made on the basis of the objectives set via the FHRMs; these maps were later used in the more detailed planning of measures. The five FRMPs also state that the maps were provided as material for

¹¹ <http://www.environment.fi/floodmaps>

¹² http://www.ymparisto.fi/fi-Vesi/Tulviin_varautuminen/Tulvariskien_hallinta/Tulvariskien_hallinnan_suunnittelu/Tulvariskien_hallinta_suunnitelmat/Kalajoen_vesistoalueen_tulvariskien_hall%2831236%29

¹³ http://www.ymparisto.fi/fi-Vesi/Tulviin_varautuminen/Tulvariskien_hallinta/Tulvariskien_hallinnan_suunnittelu/Tulvariskien_hallinta_suunnitelmat/Kemijoen_vesistoalueen_tulvariskien_hall%2829318%29

¹⁴ http://www.ymparisto.fi/fi-Vesi/Tulviin_varautuminen/Tulvariskien_hallinta/Tulvariskien_hallinnan_suunnittelu/Tulvariskien_hallinta_suunnitelmat/Tornionjoen_vesistoalueen_tulvariskien_h%2829319%29

the public participation process, but none provide an explanation on how they were specifically used in the public meetings or stakeholder workshops.

2.3 Changes to the APSFRs or other Flood Risk Areas

No changes to the identification of APSFRs or other Flood Risk Areas since December 2011 were reported in the five FRMPs assessed, and no changes have been made in the FHRMs since December 2013 either.

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

The following areas for further development were identified in the 2014 assessment of Finland's FHRMs¹⁵:

- Flood hazard maps for dam breaks are separate layers and APSFRs related to water bearing infrastructure had not been mapped yet.
- According to Art. 6.3 of the Floods Directive, the flood hazard maps should cover the geographical areas which could be flooded according to the following scenarios: low probability, medium probability (likely return period around 100 years) and high probability, where appropriate. Finland considered 50 years as a high, 100 years medium and 1000 years as a low probability scenario.
- Finnish authorities had indicated that the development of pluvial flood maps was ongoing.
- Links to national FHRMs were not available at the time for all UoMs.

The areas for further development identified have not been explicitly discussed in the 2015 FRMPs assessed, but three of the four topics are presented in detail in all the FRMPs:

- There is separate legislation for dam safety, which has been addressed in all FRMPs assessed. Flood hazard maps for dam breaks have been made for all class 1 dams as required by the Dam Safety Act. They are available in the flood map service as a separate layer.
- Flood hazard maps are available for all FRMPs assessed for the likely return periods of 20, 50, 100, 250 and 1000 years. Some areas have also maps for more frequent return periods.

Links to national FHRMs are now available for all UoMs. These links lead to a Geographic Information System (GIS) flood map service, where summary maps can also be produced.

¹⁵ European Commission, Assessment of Flood Hazard and Flood Risk Maps – Member State Report: FI – Finland, December 2014. Available at: http://ec.europa.eu/environment/water/flood_risk/pdf/fhrm_reports/FI%20FHRM%20Report.pdf

In contrast, no pluvial flood maps are found in the FRMPs assessed because no pluvial APSFRs were designated^{16 17}. The FRMP for Tornionjoki drainage area (FIVHA6) indicates that risk assessment for those incidents is the responsibility of cities and municipalities unless it affects the seawater or fluvial floods¹⁸.

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

The following **good practices** have been identified:

- Each of the five FRMPs assessed has a chapter on the PFRA and the descriptions in the FRMPs of this process are clear.
- In the PFRA, additional flood risk areas were identified that were not considered significant; these were, however, included in mapping.
- The purpose of the flood hazard and risk maps is clearly explained in the FRMPs, and the methodology behind them is well described.
- FRMPs assessed moreover describe how the FHRMs were used in their preparation, and this included setting priorities and objectives and informing the public

¹⁶ Finland clarified subsequently that no pluvial APSFRs were assigned during the first cycle of implementation of the FD, which is why no pluvial maps were prepared. For the second cycle, a general pluvial flood map has been prepared and will be mentioned in the FRMPs.

¹⁷ Finland subsequently noted that the management of pluvial flood risk is the responsibility of municipalities and should significant pluvial flood risk areas be identified, then pluvial FRMPs will be drawn up by municipalities. Clarifications about responsibilities and estimated pluvial flood risk in the target area could be added to the second FRMPs.

¹⁸ Finland added that this is case for the whole of Finland and responsibilities will be clarified better in all second FRMPs.

3. Setting of Objectives

3.1 Focus of objectives

All five FRMPs assessed have objectives that aim to reduce the adverse consequences of flood risk, for example for major roads and housing. In all FRMPs assessed, there are objectives that refer to non-structural measures, and there are also objectives that refer to measures to be implemented. Two of the FRMPs assessed (Kokemäenjoki catchment (part of FIVHA3) and Kalajoki catchment area (part of FIVHA4)) include objectives aiming to reduce the likelihood of flood risk.

Consequently, in the FRMPs assessed¹⁹:

- The objectives aim to reduce the adverse consequences of floods in all the FRMPs assessed;
- The objectives aim to reduce the likelihood of flooding²⁰, for two of the five FRMPs assessed;
- The objectives refer to measures that will be implemented for all FRMPs assessed;
- The objectives refer to non-structural measures²¹, for all five FRMPs assessed.

3.2 Specific and measurable objectives

In Finland, all objectives set by the FRMPs contain specific and measurable elements. Some objectives set quantitative targets to be achieved (e.g. number of flooded dwellings, economic damage from floods, and number of days key services are disrupted by floods) and clear locations where the objectives will be achieved (e.g. which APSFR). It is clear how some of the objectives will be achieved (e.g. by specifying measures) but there is no information by when.

The FRMPs assessed include quantifiable objectives which cover all dwellings or sites hard to evacuate. For example, in the FRMP of Kokemäenjoki catchment area (part of FIVHA3) an objective is set that all permanent housing in the flood risk area is protected from floods or preparedness to floods is such that the health and safety of people are not compromised. However, the number of dwellings is not mentioned. Specific, numeric objectives are rare. One example is found in the FRMP of Hamina and Kotka coastal area (part of FIVHA2) there is an objective setting the maximum hours of power, heat, water and telecommunication loss due to floods.

¹⁹ These categories are included in Art. 7 of the Floods Directive.

²⁰ 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.

²¹ Non-structural measures include measures such as flood forecasting and raising awareness of flooding as well as land use planning, economic instruments and insurance.

In terms of the location where the objectives will be achieved, the FRMPs for Tornionjoki catchment area (FIVHA6), Kokemäenjoki catchment area (part of FIVHA3) and Kemijoki catchment area (part of FIVHA5) define objectives separately for the APSFRs and for the whole catchment area.

For all FRMPs assessed, some objectives are clearly linked to measures that show how they will be achieved, but this is not true for all objectives. For example, for the objective “Flood Risk Management measures are not in conflict with the environmental objectives of water resources management”, the FRMP does not make it clear how it will be achieved (FRMP for Tornionjoki catchment area, FIVHA6).

None of the FRMPs set a timeframe for the achievement of objectives. The only reference to a timeframe is found in the FRMP of the Kalajoki catchment (part of FIVHA4), where three top priority objectives refer to 2018: the population is safe, flood peaks do not increase in spite of the climate change and authorities function in a coordinated manner. It is not clear whether these top priority objectives are to be achieved by 2018 or they will be revised in 2018.

3.3 Objectives to reduce adverse consequences from floods

For all five FRMPs assessed, objectives cover the following elements:

- number of dwellings flooded;
- adverse consequences of floods on human health;
- adverse consequences of floods on cultural heritage;
- adverse consequences of floods on the environment;
- adverse consequences on economic activity.

The objectives do not specify a reduction of any of these consequences as such, but rather define target levels. For example, the objectives do not specify the reduction of number of deaths but refer to the health and safety of the population: health and safety must not be compromised. In the FRMPs of Kalajoki catchment area (part of FIVHA4), Hamina and Kotka Coastal area (part of FIVHA2), Kemijoki catchment area (part of FIVHA5) and Tornionjoki catchment area (FIVHAS6), the objectives are classified into categories "Health and safety", "Essential services", "Environment", and "Cultural heritage". This has enabled the setting of specific objectives for these topics. Kokemäenjoki FRMP (part of FIVHA3) also covers these topics but puts more emphasis on safety.

Examples of objectives across the five FRMPs assessed include the following:

- Number of dwellings flooded: "There are no residential buildings in the area covered by the rare flood (1 / 100a) (or the buildings are protected so that the health and safety of people are not compromised)." (Tornionjoki FRMP, FIVHA6)).
- Human health: "During extremely rare floods (1 / 250a) the safety of permanent residents is guaranteed" (Hamina and Kotka coastal area in FIVHA2)).
- Cultural heritage: "Buildings and flooding vulnerable structures of nationally significant constructed cultural environments do not incur irreparable damage in any flood situation. New built libraries, archives and museums are protected in a very rare (1 / 250a) flood." (Kalajoki catchment area, part of FIVHA4)).
- Environment: "The extremely rare flood (1 / 250a) does not cause long-lasting or widespread damage to the environment (e.g. use of industrial plants or the storage of chemicals by these and other operators and use of wastewater treatment plants do not endanger the environment)." (Hamina and Kotka Coastal Area in FIVHA2)).
- Economic activity: "Distribution of heat and electricity functions maintained in a very rare flood situation (1 / 250a). Significant traffic connections are secured in a very rare flood situation (1 / 250a)." (Tornionjoki FRMP, FIVHA6)).

3.4 Objectives to address the reduction of the likelihood of flooding

In the FRMP of Kokemäenjoki catchment (part of FIVHA3), an objective to reduce the likelihood of flooding refers to increasing the retention of water and ice upstream of flood risk areas. In the FRMP of Kalajoki catchment (part of FIVHA4), an objective is expressed regarding climate change: "the peak water levels or water flow will not increase in spite of the climate change" (in this case, no specific measure is defined in the objectives section of the plan).

3.5 Process for setting the objectives

Overall in Finland, the process for setting the objectives ensured that:

- Objectives have been coordinated at national or regional level in all five FRMPs assessed.
- The objectives were discussed with stakeholders before their establishment in all five FRMPs assessed.

In addition, in one of the five FRMP assessed, the potential effects of climate change on the risk of flooding have been taken into account.

In all FRMPs assessed, the objectives were coordinated at a regional level in flood groups (groups formed to coordinate co-operation in each region), which have representatives from authorities of the region. A national coordination group for flood risk management provided

overall guidance, but it was emphasised that regional features should be taken into account in objective setting (summary of FRMP from Kalajoki catchment area, part of FIVHA4)). In the case of the Tornionjoki FRMP(FIVHA6), an international UoM shared with Sweden, the objectives were coordinated between the authorities of the two countries.

In all FRMPs assessed the draft objectives were discussed with stakeholders before they were accepted in the flood groups.

Only one of the assessed FRMPs includes an explicit mention of the effects of the climate change in its objectives: the plan for the Kalajoki catchment area (part of FIVHA4) includes an objective (noted above) that the flood peak should not increase with climate change.”

3.6 Good practices and areas for further development regarding setting objectives

The following **good practices** have been identified:

- All objectives contain at least some specific and measurable elements: for example, all five FRMPs assessed define clearly the location where the objectives will be achieved (for example, a specific APSFR or the whole catchment area).
- The process for setting objectives was well coordinated both at a national and regional level, and international coordination took place for the Tornionjoki FRMP (FIVHA6); moreover, stakeholders have been involved in objective setting.

The following **area for further development** has been identified:

- None of the FRMPs set a time frame for the achievement of objectives.

4. Planned measures for the achievement of objectives

Across all of Finland's UoMs and FRMPs (6 UoMs, 16 FRMPs), a total of 412 measures are reported²². Some of the national measures are assigned to more than one measure type²³. To compare the number of measures by type, a total count is used that includes each time a measure is allocated to a measure type²⁴: this total is 455 measures.

All measures are individual as Finland did not report any aggregated²⁵ measures. The average number of measures per UoM is 76, with a range between 17 and 196 measures per UoM (see Table A1 in Annex A for details²⁶)

In the classification system used for the Floods Directive, the measure types are grouped into the four main aspects²⁷: prevention, protection, preparedness, recovery and review. In Finland, measures for all four aspects are found in all six UoMs. For all six UoMs reported, in terms of the number of measures associated, protection measures are in the majority, with 142 measures (31 % of the 455 total). These are followed by Preparedness (127 measures, 28 %), Prevention (98 measures, 22 %) and Recovery (88 measures, 19 %) (see Annex A for details).

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

4.1 Cost of measures

Finland reported cost information for less than half of the measures²⁸. Estimated one-off (i.e. investment) costs are provided for 99 measures. (In addition, reporting sheets provide "actual" one-off costs for 24 measures: these refer for the most part to costs incurred before the start of the FRMP).

²² 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.

²³ See Annex B for the list of measure types.

²⁴ This approach implies double-counting.

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 Please also note, as explained in section 1, that Finland reported its measures by UoM, not by FRMP, and in some UoMs more than one FRMP was prepared.

²⁷ See Annex B. Finland did not identify any measures in the "other" category listed in this annex.

²⁸ Finland subsequently noted that total costs are available, but they were not considered certain enough for reporting.

The table below sums the estimated one-off costs provided for 99 measures: it provides a partial view of the budget:

Table 6 *Estimated one-off costs for certain measures*

	Estimated one-off costs of planned measure/s (2015-2021) in EUR (based on 99 measures)
FIVHA2	21 225 000
FIVHA3	67 289 500
FIVHA4	4 060 000
FIVHA5	376 000 000
FIVHA6	150 000
FIVHA7	4 145 000

Source: Reporting sheet

The information in the table, while based on incomplete reporting, nonetheless indicates that the budget amounts vary significantly across UoMs. The largest overall budget is for FIVHA5, which includes construction costs for a large reservoir²⁹. The second largest budgets are for FIVHA3 and FIVHA2, which respectively cover six and eight APSFRs and most of the population in Finland. The measures in these UoMs include several flood protection structures as well as geological studies. FIVHA6 has the smallest budget, and the smallest number of measures (17 measures).

Looking across all of Finland's measures, protection measures make up the largest share of measures with reported costs (a total of 49 measures, or 49 % of all measures with costs reported). Most measures were reported as having a cost between EUR 10 000 and EUR 50 000: 19 protection measures (39 % of protection measures with reported costs), 21 prevention measures (84 % of prevention measures with reported costs), 17 preparedness measures (85 % of preparedness measures with reported costs), and four recovery & review measures (80 % of recovery & review measures with reported costs). See Table A3 and Figure A3 in Annex A for details.

Many measures have no budget allocated, as they are planned to be carried out as part of the normal work of municipal or regional authorities. This work may include planning, instructions, permitting processes and land use planning. The costs that are assumed to be carried by landowners as a part of their own regular activities or legal obligations are also not budgeted.

These figures are based on Finland's reporting of one-off project costs. For some measures, there is also information in the reporting sheets on budgeted annual expenses and expenditure to date.

²⁹ The project is costly and also controversial due to its potential impacts on nearby natural values.

4.2 Funding of measures

While Finland's reporting sheets do not provide information on funding, the five FRMPs assessed do contain some information: all refer to the use of regional and local public budgets, but do not specify other funding sources (see the table below). It is believed that national funds will be used for some larger construction projects, but this is not clearly specified in the FRMPs. According to the information reported by Finland, the costs of private actors are not budgeted.

Table 7 *Funding of measures*

	Hamina and Kotka FRMP in FIVHA2	Kokemäenjoki FRMP in FIVHA3	Kalajoki FRMP in FIVHA4	Kemijoki FRMP in FIVHA5	Tornionjoki FRMP, FIVHA6
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

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

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

In all five FRMPs assessed, most measures are clearly described in terms of the target area, their schedule and the responsible authority for each. In the FRMPs of Kokemäenjoki catchment area (part of FIVHA3), Kemijoki catchment area (part of FIVHA5) and Tornionjoki UoM (FIVHA6), this information was provided in summary tables³⁰.

The five FRMPs assessed provide detail on the location of measures, specifying four possible levels of location: RBD/UoM, sub-basin, APSFR, or a single water body (see the table below).

Table 8 *Location of measures*

	Hamina and Kotka FRMP in FIVHA2	Kokemäenjoki FRMP in FIVHA3	Kalajoki FRMP in FIVHA4	Kemijoki FRMP in FIVHA5	Tornionjoki FRMP in FIVHA6
International					
National					
RBD/UoM					✓
Sub-basin					✓
APSFR or other specific risk area	✓	✓	✓	✓	✓
Water body level		✓	✓	✓	✓

Source: FRMPs

4.4 Measures and objectives

In three of the five FRMPs assessed, there is information indicating how measures will contribute to the achievement of objectives. None of the FRMPs assessed, however, specify how much each measure will contribute, nor whether the objectives will be achieved when all measures are completed.

In the FRMPs of Tornionjoki UoM (FIVHA6), Kokemäenjoki catchment area (in FIVHA3) and Kemijoki catchment area (in FIVHA5) there is a description for each measure for which objectives they contribute to and what flood protection benefits they bring. In the FRMP (Annex 10) of Kokemäenjoki catchment area, there is an analysis whether each measure contributes to the objectives directly or indirectly through flood protection benefits. For example, improved flood risk maps contribute indirectly to the public safety objective. An assessment of the flood protection benefits of each measure are also presented (Annex 9). In the FRMP of Hamina and Kotka coastal area (part of FIVHA2), no reference to objectives is made in the description of measures. There is a table on objectives in this FRMP, but only a few examples of measures are given for each objective. In the section on the implementation of measures, it is said that "it is estimated that the objectives set will be met using the outlined

³⁰ In chapters on "Summary and implementation".

measures". In the FRMP of Kalajoki catchment area (part of FIVHA4), there is an assessment whether the objectives will be met but no clear connection to single measures is made. In the description of measures no connection to objectives is made.

4.5 Geographic coverage

In Finland's reporting sheets, all measures indicated the UoM as the location. The reporting sheets referred to the APSFRs as the geographic coverage of the measures, with 151 measures spanning more than one APSFR and the others, only one APSFR.

As noted above, Finland's FRMPs provide further detail on the location of measures. Most of the measures are at the level of the APSFR or municipalities within it. The differences between FRMPs assessed are mainly related to the nature of the planning area: while three FRMPs cover more than one APSFR, the Hamina and Kotka coastal area covers a single APSFR and the Tornionjoki FRMP (FIVHA6) covers a whole UoM.

4.6 Prioritisation and timetable of measures

According to data that Finland has reported for all 16 FRMPs, no measures were categorised as critical. The vast majority of measures are categorised as of very high priority: 316 of 455 (69 %). High priority measures represent only 35 of 454 (8 %); moderate priority measures, 62 of 455 (14 %); and low priority measures, 42 (9 %).

The number of very high priority measures is distributed rather evenly across the measure aspects: prevention (86), protection (92) and preparedness (85) – in each case, just under 30 % of the 316 very high priority measures. The recovery and review category has the lowest number (53) of very high priority measures, 17 % of the total. Looking within each measure aspect, however, 88 % of prevention measures are of very high priority, compared with about 65 % for protection and preparedness measures and 60 % for recovery and review measures. (See Table A5 and Figure A5 of Annex A for further information).

All UoMs have the highest number of measures categorised as very high priority, but in FIVHA3 and FIVHA4 the highest share of measures is classified in this category: 156 of 196 measures and 42 of 50 measures, respectively, about 80 % for each. In contrast, in the four other UoMs, the share of this category is around 50 %. (See Table A6 and Figure A6 of Annex A for further information.)

Four of the five FRMPs assessed provide information on how priorities were set.

The FRMPs of the Tornionjoki UoM (FIVHA6) and the Kokemäenjoki catchment (part of FIVHA3) list the following six criteria used in prioritisation:

- achieving targets set for flood risk management;
- measures other than constructing flood protection structures;
- the effectiveness of the various measures to reduce the likelihood of floods and their damaging consequences;
- the costs and benefits of the measures;
- compatibility of measures with river basin management; and
- environmental impact assessments.

In the FRMP of Kemijoki catchment area (in FIVHA5), only three main criteria were used in prioritisation:

- achieving the objectives of flood risk management;
- the effectiveness of the various measures to reduce the likelihood of floods and their damaging consequences; and
- the costs and benefits of the measures.

In the FRMP of Hamina and Kotka coastal area (part of FIVHA2), priority was given to those measures that were considered the most efficient in flood risk management. Information about the prioritisation of the measures was not found in the FRMP of the Kalajoki catchment area (part of FIVHA4). Information provided on climate change (see section 5) indicates that versatility to address possible future climate impacts was considered in the selection process across Finland.

All five FRMPs assessed provide information on their timetable of measures. Many of the measures (for example measures related to land use planning and self-preparedness) are continuous, with no end date. For other measures, the time of completing the work is given either as an exact year or estimate of duration time (years of number of planning periods). Most measures will be completed during the first planning period (2016-2021).

There is a difference among the time periods presented across the FRMPs assessed: while FRMPs for Kemijoki (in FIVHA5) and Tornionjoki (FIVHA6) catchment areas extend the timetable to up to three planning periods for their investment measures (i.e. to 2027 and even 2031), the FRMPs of Hamina and Kotka coastal area (part of FIVHA2) and Kokemäenjoki catchment area (part of FIVHA3) only cover the end of the first planning period (2021). The FRMP of Kalajoki catchment area (part of FIVHA4) has two investment measures with timetables that go respectively for 6 and 12 years.

Finland reported information to WISE on the timetables of measures: dates are given for when a measure is proposed and when it is estimated to be completed.

4.7 Authorities responsible for implementation of measures

Finland reported information on the authorities, but named 288 different authorities, making a quantitative assessment difficult. For many measures, more than one responsible authority was reported, creating double counting and making the aggregation of the data difficult. Overall, most measures reported municipal and regional authorities as the responsible authorities, with municipalities responsible for the highest number of measures. Some measures reported also national or UoM authorities as the responsible authorities. Regional authorities appear to play a more significant role dealing with protection and preparedness measures compared to other types of measures.

4.8 Progress of implementation of measures

For all 16 FRMPs reported, a little more than a half of the measures are reported in the category of progress on-going (235 of 454 measures, 52 %) and a little less than a half have not been started (211 of 454 measures, 47%). Few measures are reported as completed (seven measures, 1.5 %) or under construction (one measure, 0.2 %).³¹

Among measures not started, 35 of 98 prevention measures (36 %) are in this category, 81 of 141 protection measures (57 %), 62 of 127 preparedness measures (49 %) and 33 of 88 recovery and review measures (38 %). (See Table A7 and Figure A7 in Annex A.)

For FIVHA2 and FIVHA3, the majority have not been started: 88 of 154 measures in FIVHA2 (57 %) and 104 of 195 measures in FIVHA3 (53 %). In the other UoMs, a majority of measures have progress ongoing, and the vast majority of the measures of FIVHA6 and FIVHA7 have progress ongoing: 16 of 18 and 15 or 17, respectively, just under 90 % for each. (see Table A8 and Figure A8 in Annex A for details).

4.9 Measures taken under other Community Acts

Finland has not reported any measures that have been implemented under other EU legislation.

4.10 Specific groups of measures

With regard to **spatial planning/land use measures**, all FRMPs assessed report a similar measure, under which floods will be taken into account in land-use planning. There is no information, however, whether the framework for land-use planning has evolved since 2000.

Natural water retention measures (NWRMs) have been planned in four of the five FRMPs assessed. This kind of a measure was not included in the FRMP of the Hamina and Kotka

³¹ Please note that the total used here is 454 measures, as one measure was reported as both completed and not started and was excluded from the analysis.

Coastal Area (part of FIVHA2), which focused on seawater flooding. The FRMPs of Tornionjoki UoM (FIVHA6) and Kemijoki catchment area (in FIVHA5) each include a measure targeted to actors in agriculture and forestry³² and another measure studying the potential of natural retention in the catchment area³³. In the FRMP of Kalajoki catchment area, for example, one measure is called “natural temporary storage” and it includes promoting wetlands (NWRM measure type N02³⁴) as well as flood meadows (NWRM A01) and forests (NWRM F14) in land use planning.

The five FRMPs assessed do not include any specific **measures targeted to nature conservation** – however, all five FRMPs assessed address the effects of other flood measures on biodiversity or on Natura 2000 sites in their impact assessments.

Navigation and port infrastructure have been considered in the impact assessment of the measures for Hamina and Kotka coastal area. However, there are no measures specifically targeting these.

References to **dredging** measures are found only in some of the FRMPs assessed. In the FRMP of Kokemäenjoki catchment area there are two measures related to dredging: “dredging of existing river channels in the centre of Pori”, and “Mowing and dredging of the estuary of the Kokemäki river in the Pihlavanlahti Bay”³⁵.

4.11 Recovery from and resilience to flooding

The role of insurance policies is discussed in all five FRMPs assessed, with regard to the recovery from flooding, preparedness/resilience to flood or other issues; however, only three of the five include measures that address insurance.

In the FRMPs of Tornionjoki (FIVHA6), Kemijoki catchment area (in FIVHA5) and Hamina and Kotka (in FIVHA2), coastal area insurance is discussed in connection with the measure “self-preparedness of land owners”. It includes awareness raising on insurance among other topics. In the other FRMPs, insurance is mentioned in connection with a legislative change: previously, the state paid compensation of flood damages, and from the beginning of 2014 it is covered by private insurance in the whole of Finland.

With regard to the type of insurance available or to be developed for potential flooding areas, insurance is available for domestic properties, home contents, and small businesses.

³² These measures cover the following NWRM measure types: A01, meadows and pastures; N02, wetland restoration and management; F02, Maintenance of forest cover in headwater areas; F14, Overland flow areas in peatland forests.

³³ These measures cover the following NWRM measure types: N01, basins and ponds; N02, wetland restoration and management; and N13, Restoration of natural infiltration to groundwater.

³⁴ See Annex B for NWRM measure types.

³⁵ The mowing refers to management of reeds and seagrasses.

Compensation for loss of agricultural crops is now also based on private insurance (starting in 2016).

With regard to flood insurance for properties in flood risk areas, and in particular in high flood risk areas, insurance may not be available. Insurance rules may vary, but usually they cover only rare floods occurring once in 50 years or less frequently. More frequently occurring flood damage compensation may not be available³⁶.

The available information suggests that insurance is not conditional on making at risk properties (domestic, industrial) as flood resilient as possible on sites at risk of major, rare floods. The available information suggests that environmental liability insurance does not cover the restoration costs arising from flooding of potentially polluting sites and installations and that ecosystem services are not considered in estimating restoration costs in cases where potentially polluting sites and installations may be flooded.

4.12 Monitoring progress in implementing the FRMP

In each area, the Competent Authority undertakes monitoring in cooperation with flood groups that have representatives of public bodies and private stakeholders. Information on each measure is provided in a national flood information portal for public authorities. Indicators have been defined for the monitoring of the implementation of the measures. Most indicators describe the progress of the measures, for example in terms of the number of flood-protected residents. Implementation progress will be reviewed regularly: the reporting sheets for the Kokemäenjoki and Kemijoki FRMPs refer to annual monitoring, though the other reporting sheets do not specify the intervals.

In at least three of the five FRMPs assessed, a baseline has been established against which progress will be monitored and assessed. In the FRMPs for Kalajoki (part of FIVHA4), Kemijoki (in FIVHA5) and Tornionjoki (FIVHA6), a baseline has been established for each measure, and it is presented in the section where the measures are described. For example, the baseline for the measure self-preparedness of inhabitants that inhabitants know poorly their responsibilities in flood protection (Kalajoki); the baseline for the measure construction of flood walls for Rovaniemi is that there are no flood walls in that location; the baseline for the development of a flood-proof sewerage network is that a part of the sewerage network in the flood risk area is located in the area of elevated flood risk and some of the sewage pumping stations may have to be shut down by floods. In the FRMPs of Hamina and Kotka coastal area (part of FIVHA2) and Kokemäenjoki catchment area (part of FIVHA3), no information on the baseline was found.

³⁶ Subsequently Finland stated that insurance conditions are company-specific, but more or less comparable. Indeed, if a rare flood occurs for the second time at the same place, it is still possible to get compensation, as long as the likelihood of the flood event is estimated at around 1/50 or less frequent.

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

	All FRMPs assessed
Integration of FRMP and RBMP	
Joint consultation of draft FRMP and RBMP	✓
Coordination between authorities responsible for developing FRMP and RBMP	✓
Coordination with the environmental objectives in Art. 4 of the WFD	✓
The objectives of the Floods Directive were considered in the preparation of the RBMPs ^a	✓
Planning of win-win and no-regret measures in the FRMP	
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 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

All FRMPs assessed have a similar procedure of coordinating the FRMP with the RBMPs of the WFD. The same authority has been responsible for the preparation of both FRMPs and RBMPs, and the consultation processes of these plans have occurred at the same time. The planning principle has been that the measures in one plan should not significantly threaten the objectives and positive impacts of the other plan. The impact of flood risk management measures on the achievement of water management objectives has been assessed using a five level scale: very positive, positive, neutral, negative and very negative.

In its reporting under the WFD, Finland indicates that in all RBDs, the objectives of the Floods Directive were considered in the preparation of the RBMPs. Finland also indicates that the PoMs for all RBDs included win-win measures in terms of achieving the objectives of the WFD and Floods Directive, drought management and NWRMs.

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

The following **good practices** were identified:

- All FRMPs assessed had an impact assessment process with a sound method that was used to select the combination of measures. Multi-objective assessment methodology was used, following guidance from the Finnish Environment Institute.
- All FRMPs assessed contained clear information on the geographic location, timetable and responsibilities related to the planned measures.
- Three of the five FRMPs assessed the link between measures and objectives.
- The FRMPs assessed include measures that address spatial planning and natural water retention.
- The impact of flood risk management measures on the achievement of water management objectives has been assessed using a five level scale: very positive, positive, neutral, negative and very negative.
- All the FRMPs assessed establish a clear process for monitoring the progress of their measures, based on a national approach.

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

- All FRMPs assessed lacked a description of how much the measures contribute to the achievement of objectives, and most FRMPs did not contain a description of whether the objectives will be met when all measures are implemented.
- One FRMP (for the Kalajoki catchment area, part of FIVHA4) did not specify prioritisation methods or criteria.

5. Consideration of climate change

All five FRMPs assessed include a systematic analysis of the adaptability of measures to changing climate conditions. One FRMP, Kalajoki catchment area (part of FIVHA4), has included adaptation to climate change among its objectives (see section 3 above). Climate change has been considered in the process to assess and select the measures, where versatile measures are preferred.

If floods are anticipated to increase due to climate change, this will be taken into account in the second planning period for FRMPs.

The timeframes for the climate change scenarios that have been considered are from 50 to 100 years. Four of the five FRMPs assessed (all except Hamina and Kotka coastal area) provide a reference to a shift in the occurrence of extreme events and changes in numerical recurrence times. The shift mentioned is from spring floods to summer/autumn and/or winter floods. This is related to the reduction of snow and ice cover due to climate change. The main sources of flooding are not expected to change under the long-term climate change scenarios.

Despite these elements, none of the five FRMPs assessed make reference to Finland's national adaptation policy documents: Finland established a National Adaptation Strategy in 2005; following an evaluation of the Strategy in 2013, it was updated in 2014 by the National Climate Change Adaptation Plan 2022³⁷.

5.1 Specific types of measures to address climate change

As noted above, Finland did not identify specific types of measures to address climate change – rather, the approach has been to select versatile measures.

The adaptability of different measures to the changing climate was assessed. Most measures are well adapted to the changing climate. For example, in the Kemijoki catchment area all structural measures planned are considered to be well adapted to a changing climate.

Concerning the non-structural measures planned, the Kemijoki FRMP states that land-use planning is a long-term flexible measure which helps to adapt new activities to changing climate conditions. In the FRMPs of Tornionjoki and Kemijoki catchment areas, the land use planning measure includes updating the lowest allowed building sites³⁸ to take into account climate change impacts on flood levels.

³⁷ For further information, see: <http://mmm.fi/en/national-climate-change-adaptation-plan>

³⁸ To avoid building on sites at low elevations that are at risk of flooding.

5.2 Good practices and areas for further development concerning climate change

The following **good practice** was identified:

- All FRMPs assessed include a systematic assessment of the adaptability of measures to changing climate conditions. The FRMPs considered climate change scenarios (for 50 and 100 years).

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

- None of the five FRMPs assessed refer to Finland's national policy documents on adaptation.

6. Cost-benefit analysis

A CBA was used in the prioritisation and planning of measures in all five of the FRMPs assessed. CBA was conducted for the proposed measures at the appropriate level of accuracy in those cases where the economic benefits or cost data were available.

The comparison of the benefit of the measures relative to the cost was described either as a repayment period (how long it would take to pay the cost of the investment with the benefits it produces) or as a net amount, for those measures where information was available for both costs and benefits. The cost estimates included the design and construction costs of the measure as well as the present value of service and maintenance costs. The timeframe used was the life cycle of the measure and the discount rate used was 3.5 %. If it was possible to estimate the benefits of a measure in monetary terms, a corresponding expected value of annual benefit was estimated for flood risk management. The benefit of flood risk management was estimated based on the value of avoided flood damage.

The cost-benefit assessment was used for flood protection infrastructure projects (i.e. grey measures), for example construction of flood walls. The flood protection benefits were estimated in terms of avoided flood damage. Other benefits were not included in the cost benefit analysis, but the flood control benefits of each measure were assessed separately. However, the cost-benefit method did not consider multi-benefits.

For those non-market or continuous measures whose monetary valuation is difficult to estimate, the benefits were assessed as part of the Multi-Criteria Decision Analysis (MCDA). For this reason, it was not possible to assess all the measures using a similar method, and in these cases only the costs were estimated in Euros.

CBA was used to assess measures with transboundary effects for one measure in the FRMP for Tornionjoki catchment area, the only FRMP assessed with cross-border aspects: this was for the raising of flood protection walls on Suensaari (an island in the city of Tornio on the Finnish side of the border just across from Haparanda in Sweden), a joint measure with Sweden.

6.1 Good practices and areas for further development

The following **good practice** was identified:

- The CBA had a broad scope and accommodated the fact that not all effects could be measured in monetary terms.

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

- CBA was carried out only for some measures where information was available and exclusively for flood protection infrastructure measures.

7. Governance including administrative arrangements, public information and consultation

7.1 Competent authorities

No updates to the Competent Authorities and/or UoMs identified for the Floods Directive have been submitted to the European Commission since 2011. The five FRMPs assessed did not indicate any changes to the Competent Authorities.

7.2 Public information and consultation

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

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

	Hamina and Kotka FRMP in FIVHA2	Kokemäenjoki FRMP in FIVHA3	Kalajoki FRMP in FIVHA4	Kemijoki FRMP in FIVHA5	Tornionjoki FRMP, FIVHA6
Media (papers, TV, radio)	✓	✓	✓	✓	✓
Internet	✓	✓	✓	✓	✓
Digital social networking	✓	✓		✓	✓
Printed material					
Direct mailing					
Invitations to stakeholders					
Local Authorities					
Meetings	✓	✓	✓	✓	✓

Source: FRMPs

All FRMPs assessed used multiple media for reaching the public and stakeholders. The traditional media used was newspapers and press releases. All FRMPs assessed except for the Kalajoki catchment area reported having used social media, but the type of social media was not further specified. The meetings were both public meetings organised to inform people and talks in seminars and other events.

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

Table 11 *Methods used for the actual consultation*

	Hamina and Kotka in FIVHA2	Kokemäenjoki FRMP in FIVHA3	Kalajoki FRMP in FIVHA4	Kemijoki FRMP in FIVHA5	Tornionjoki FRMP, FIVHA6
Via Internet	✓	✓	✓	✓	✓
Via digital social networking		✓		✓	✓
Direct invitation					
Exhibitions					
Workshops, seminars or conferences	✓	✓	✓	✓	✓
Telephone surveys					
Direct involvement in drafting FRMP	✓	✓	✓	✓	✓
A mail survey			✓		
A survey in a public meeting				✓	

Source: FRMPs

Workshops were organised to involve stakeholders outside flood groups. Public consultation was carried out via internet or in public meetings. The summaries of FRMPs of Kokemäenjoki, Kemijoki and Tornionjoki report having used discussions in social media in consultation, but the extent of discussions or the type of social media used is not specified. A national consultation web site, www.otakantaa.fi, was used for public comments.

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

For all five FRMPs assessed, the documents were available in the municipalities, and after the naming of the flood groups on 22December 2011, on their internet pages. All FRMPs assessed had similar information.

7.3 Active involvement of Stakeholders

As part of the overall consultation, authorities should encourage the active involvement of stakeholders. The table below shows the groups of **stakeholders** that have been actively involved in the development of the five FRMPs assessed:

Table 13 *Groups of stakeholders*

	Hamina and Kotka FRMP in FIVHA2	Kokemäenjo ki FRMP in FIVHA3	Kalajoki FRMP in FIVHA4	Kemijoki FRMP in FIVHA5	Tornionjoki FRMP in FIVHA6
Civil Protection Authorities such as Government Departments responsible for emergency planning and coordination of response actions					
Flood Warning / Defence Authorities					
Drainage Authorities					
Emergency services	✓	✓	✓	✓	✓
Water supply and sanitation	✓				
Agriculture / farmers					
Energy / hydropower		✓		✓	
Navigation / ports	✓				
Fisheries / aquaculture					
Private business (Industry, Commerce, Services)	✓		✓		
NGO's including nature protection, social issues (e.g. children, housing)				✓	✓
Consumer Groups					
Local / Regional authorities	✓	✓	✓	✓	✓
Academia / Research Institutions					
Finnish-Swedish Transboundary River Commission					✓

Source: FRMPs

In all FRMPs assessed, flood groups with representatives of regional and local authorities and emergency services were consulted. Other stakeholders involved in the consultation in some FRMPs were the port authorities in the Hamina and Kotka coastal area and permanent experts in the Kemijoki and Tornionjoki catchment areas. The permanent experts in the Kemijoki catchment area include experts from a hydropower company, the regional nature conservation NGO, and the regional water protection association. In Tornionjoki catchment area, the permanent experts include the Finnish-Swedish Transboundary River Commission and a regional nature conservation NGO. These groups were actively involved in the drafting and assessing of the plans. Stakeholders were also involved in the assessment of the measures in

workshops, but this is considered as consultation, rather than active involvement. Temporary experts were invited to be heard and give advice on certain questions in the meetings of the flood groups but there is no further information on who they were.

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	
Establishment of advisory groups	✓
Involvement in drafting	✓
Workshops and technical meetings	
Formation of alliances	

Source: FRMPs

The active involvement of stakeholders was in the form of acting as members or permanent experts in the flood groups. Permanent experts have the right to take part in the discussions, but they have no official decision-making power.

7.4 Effects of consultation

Three of the five FRMPs assessed included information on the effects of consultation on the plans. The table below provides an overview of **effects** of consultation for these FRMPs:

Table 15 *Overview of the effects of consultation*

	Hamina and Kotka FRMP in FIVHA2	Kokemäenjoki FRMP in FIVHA3	Kalajoki FRMP in FIVHA4	Kemijoki FRMP in FIVHA5	Tornionjoki FRMP in FIVHA6
Changes to selection of measures					
Adjustment to specific measures	✓				
Addition of new information					✓
Changes to the methodology used					✓
Commitment to further research					
Commitment to action in the next FRMP					

	Hamina and Kotka FRMP in FIVHA2	Kokemäenjoki FRMP in FIVHA3	Kalajoki FRMP in FIVHA4	Kemijoki FRMP in FIVHA5	Tornionjoki FRMP in FIVHA6
A summary of measures was added	✓				
The consultation had an effect on which measures would be given top priority			✓		

Source: FRMPs

The FRMPs of Kokemäenjoki and Kemijoki catchment areas included a description of the main points in comments received but did not include a summary of how consultation was taken into account in the plan. The FRMP of Hamina and Kotka Coastal area did not include any explicit description of how consultation results were taken into account in the plan, but there is a detailed description of comments, and at least a part of them have been taken into account in the final plan. For example, the City of Hamina requested that a museum bridge should be taken into account in the planning of one measure, and text regarding the measure had been added. Also, a clear summary of measures had been added upon request. In the FRMP of Kalajoki catchment area, the consultation resulted in giving more attention to the development of approaches for the regulation of the water level in water bodies during the first planning period. In addition, it became clear that self-preparedness of residents and awareness raising is the most important flood risk management measure and it should be given highest priority. In the FRMP for Tornionjoki catchment area, assessment of impacts on fishery was added to the assessment of measures, and new information was added in the SEA report.

7.5 Strategic Environmental Assessment

All FRMPs assessed underwent an SEA procedure, and its hearings were carried out in connection with the hearings of the FRMPs. The SEA reports are included in the FRMPs as annexes. The SEA processes were led by consultants and, according to the SEA reports, carried out with sound methodology.

7.6 Good practices and areas for further development regarding Governance

The following **good practices** were identified:

- The public has been informed of the different phases of the planning process using different media in all FRMPs assessed.
- The plans were presented in various occasions to the public and to stakeholders in all FRMPs assessed. The work of the flood groups integrated the views of stakeholders in the preparation of the plans, including drafting.

- The Finnish-Swedish Transboundary River Commission had an expert member in the flood group and was actively involved in the drafting of the FRMP of Tornionjoki UoM (FIVHA6).
- All FRMPs assessed underwent a Strategic Environmental Assessment (SEA) procedure, and the SEA hearings were carried out in connection with the hearings of the FRMPs. The SEA reports are included in the FRMPs as annexes.

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

- Not all FRMPs assessed involved NGOs, fisheries or industry in an active role in the drafting process via the flood groups (however not all stakeholders may be relevant in all FRMPs). Despite there being description of consultation results and statements that the results were taken into account, not all FRMPs assessed included a description of how the consultation results were taken into account in the final drafting of the plan.

Annex A: Supplementary tables and charts on measures

This Annex gives an overview of the data on measures reported by Finland 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 the 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)³⁹, not all fields are mandatory, and, as such, not all Member States reported information for all fields.

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

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

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

³⁹ <http://icm.eionet.europa.eu/schemas/dir200760ec/resources>

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

Types of measures used in reporting

The following table⁴⁰ is used in the reporting on the types of measures. Each type of measures is coded as an M-number. Measures are grouped in an ‘aspect’.

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

⁴⁰ 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	412
Number of individual measures including measures which have been allocated to more than one measure type	455
Number of aggregated measures	0
Number of aggregated measures including measures which have been allocated to more than one measure type	0
Total number of measures	412
Total number of measures including measures which have been allocated to more than one measure type	455
Range of number of measures between UoMs including measures which have been allocated to more than one measure type (Min-Max)	17 - 196
Average number of measures across UoMs including measures which have been allocated to more than one measure type	76

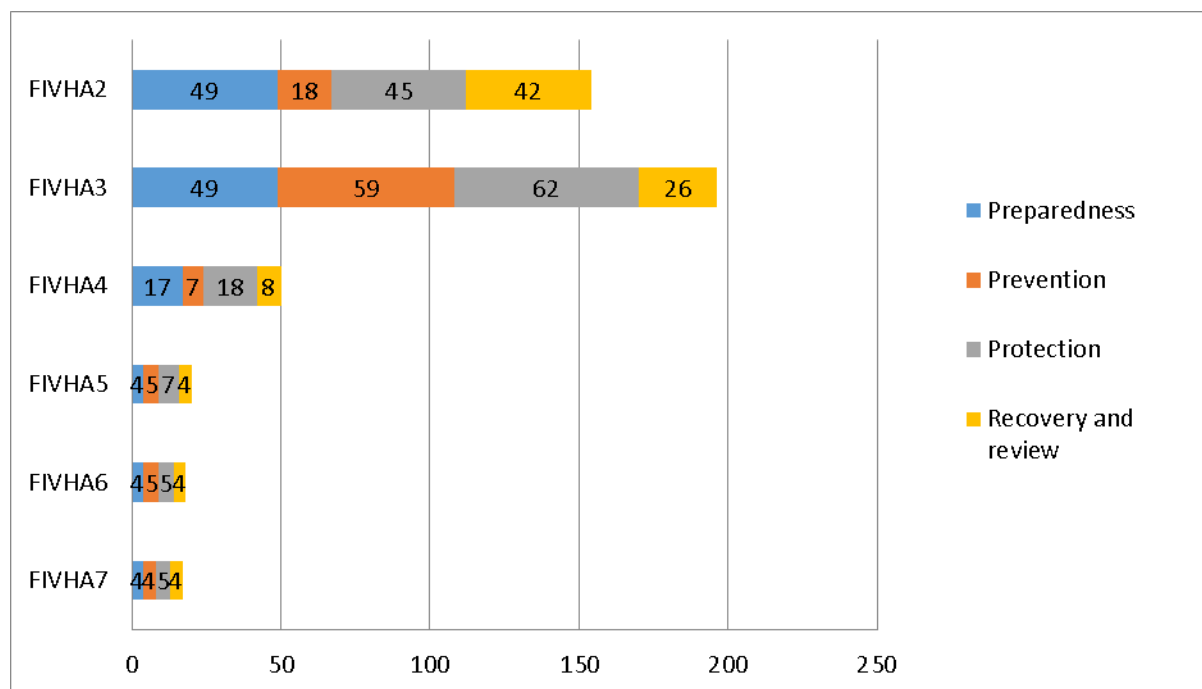
Table A2: Total number of measures (aggregated and individual), per type and UoM, including duplicates

	Preparedness				Total	Prevention				Total	Protection				Total	Recovery and review			Total	Other	Grand Total
	M41	M42	M43	M44		M21	M22	M23	M24		M31	M32	M33	M35		M51	M52	M53			
FIVHA2	10	12	11	16	49	5		10	3	18	1		14	30	45	29	4	9	42		154
FIVHA3	13	7	13	16	49	16	13	15	15	59	2	7	23	30	62	14	2	10	26		196
FIVHA4	2	4	6	5	17	2		3	2	7	3	3	6	6	18	2	2	4	8		50
FIVHA5	1	1	2		4	1		2	2	5	1	1	3	2	7	3	1		4		20
FIVHA6	1	1	2		4	1		2	2	5	1		2	2	5	3	1		4		18
FIVHA7	1	1	2		4	1		1	2	4			4	1	5	3	1		4		17
Grand Total	28	26	36	37	127	26	13	33	26	98	8	11	52	71	142	54	11	23	88	0	455
Average per UoM	5	4	6	6	21	4	2	6	4	16	1	2	9	12	24	9	2	4	15	0	76

Note: See Types of measures, above, and Annex B for the codes used. The total includes measures assigned to more than one measure type. All measures are individual as Finland did not report any aggregated measures.

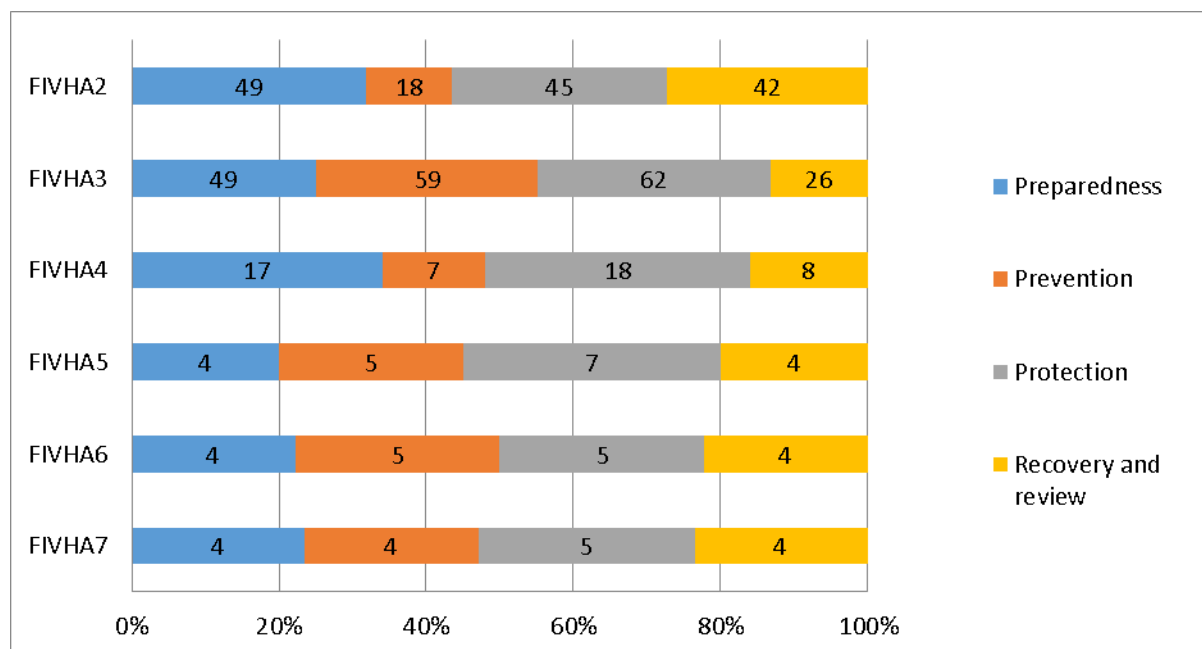
The information in Table A2 is visualised in Figures A1 and A2 below:

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



Notes: The total includes measures assigned to more than one measure type.
All measures are individual as Finland did not report any aggregated measures.

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



Notes: The total includes measures assigned to more than one measure type.
All measures are individual as Finland did not report any aggregated measures.

Measure details: cost

Member States were requested to provide information on:

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

Cost

Finland provided cost estimates in various ways: an *estimated* one-off cost was given for 99 measures, annual cost *estimates* for 25 measures, *actual* costs for 21 measures, and *actual* annual costs for 24 measures.

The figure below shows the information reported for estimated one-off costs, as this category was the most straightforward to aggregate and compare. The highest amount was 370,000,000 EUR while the lowest was 3,000 EUR (both for protection measures).

Table A3: One-off cost estimates by measure aspect

	Prevention	Protection	Preparedness	Recovery & Review	Grand Total
<10 000		1	1		2
10 000-50 000	21	19	17	4	61
50 001-100 000	2	17	2		21
100 001-500 000	2	7			9
>500 001		5		1	6
Total	25	49	20	5	99

Figure A3: Visualisation of Table A3: One-off cost estimates by measure aspect

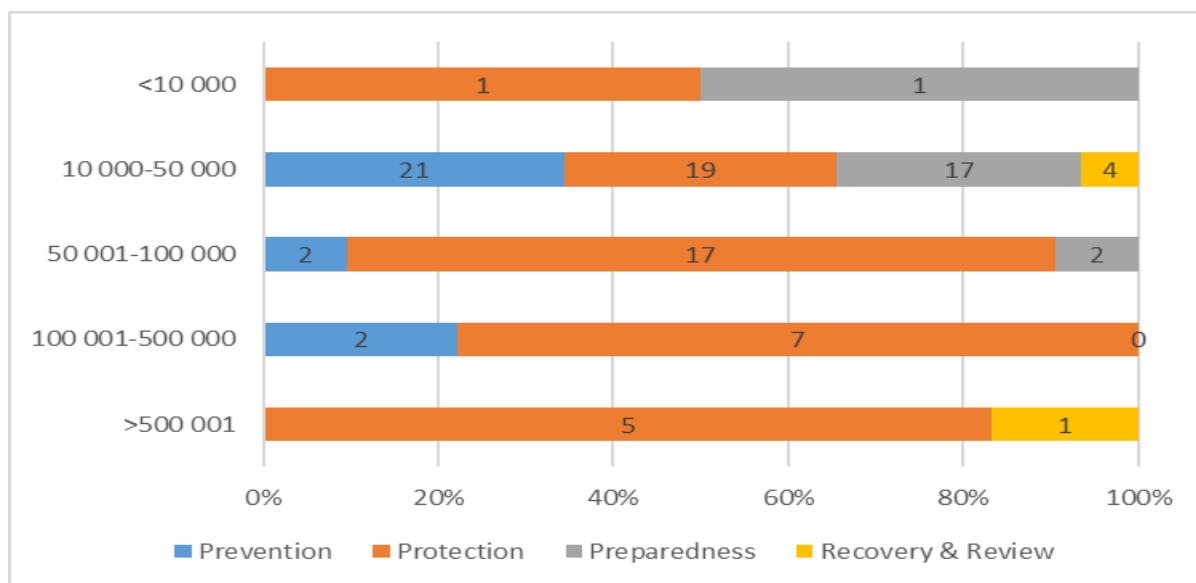
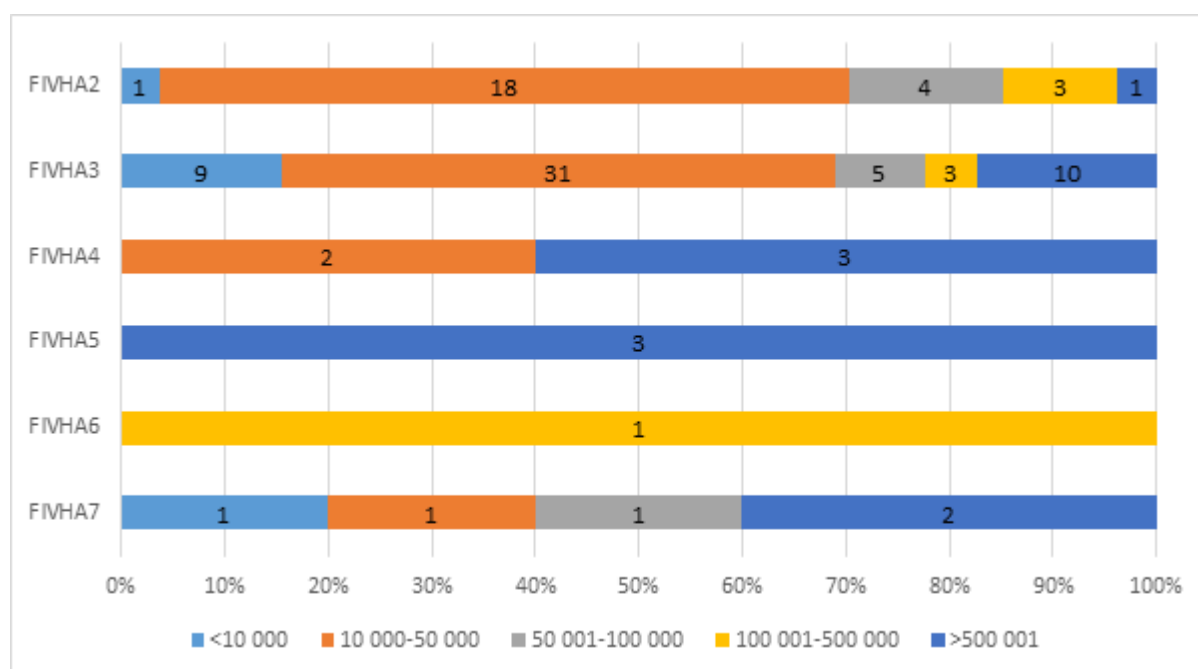


Table A4: One-off cost estimates by UoM

	<10 000	10 000-50 000	50 001-100 000	100 001-500 000	>500 001	Total
FIVHA2	1	18	4	3	1	27
FIVHA3	9	31	5	3	10	58
FIVHA4		2			3	5
FIVHA5					3	3
FIVHA6				1		1
FIVHA7	1	1	1		2	5
Total	11	52	10	7	19	99
Average per UoM	2	9	2	1	3	28

Figure A4: Visualisation of Table A4: One-off cost estimates by UoM



Cost explanation

In the reporting sheet, 261 measures had information for cost explanation. It seems that many of these explanations also include some numerical information, but a quantitative analysis is not possible.

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

The location of the measures was indicated as the UoM.

Geographic coverage

Geographic coverage was determined by APSFRs for all measures, with 151 measures spanning more than one APSFR.

Measure details: objectives

This section provides 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

Finland reported objectives for all measures in the reporting sheets. The objectives seem to be variations on standard answers, but with 170 different objectives, it is not possible to quantify them.

Category of priority

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

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

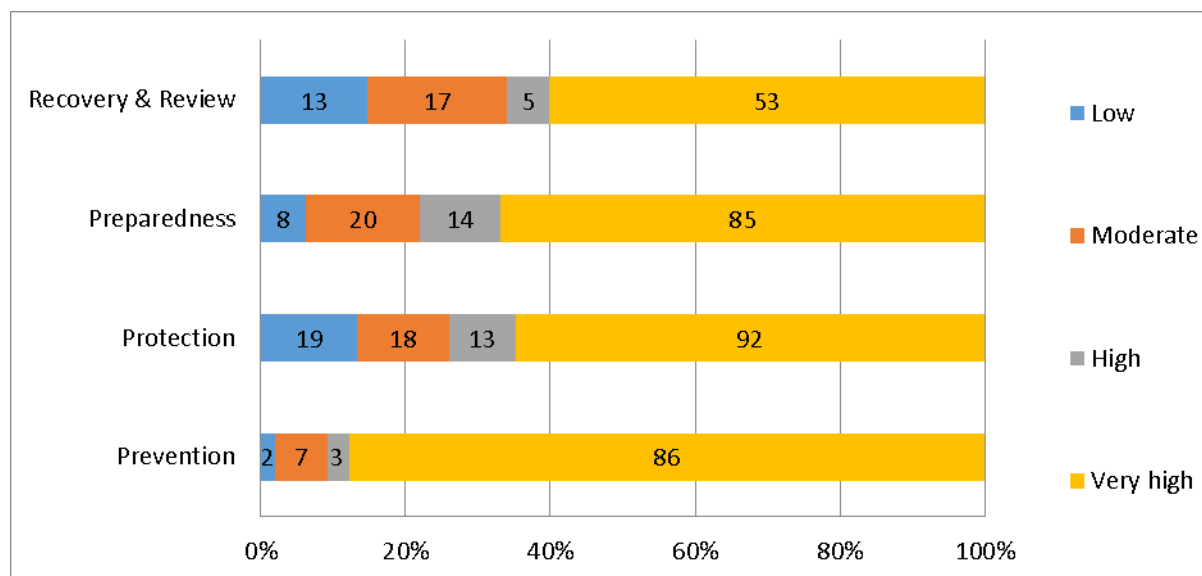
Table A5: Category of priority by measure aspect

	Low	Moderate	High	Very high	Grand Total
Prevention	2	7	3	86	98
Protection	19	18	13	92	142
Preparedness	8	20	14	85	127
Recovery & Review	13	17	5	53	88
Grand Total	42	62	35	316	455

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

No measures were categorised as critical.

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



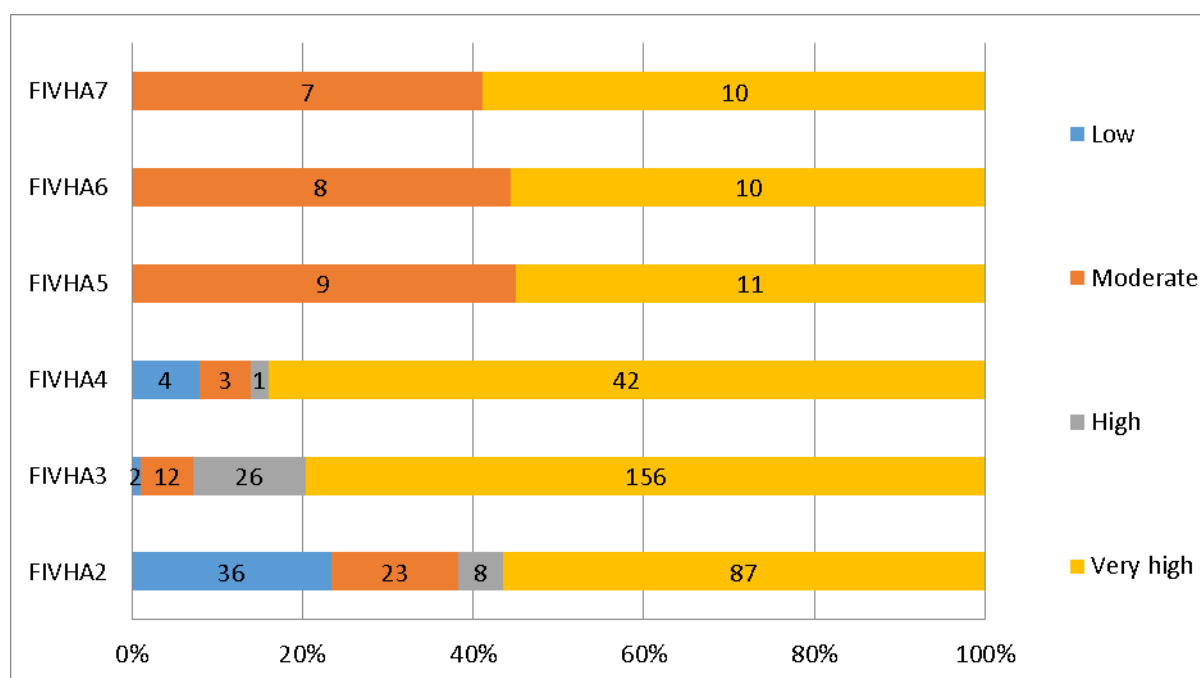
Notes: The total includes measures assigned to more than one measure type.
No measures were categorised as critical.

Table A6: Category of priority by UoM

	Low	Moderate	High	Very high	Grand Total
FIVHA2	36	23	8	87	154
FIVHA3	2	12	26	156	196
FIVHA4	4	3	1	42	50
FIVHA5		9		11	20
FIVHA6		8		10	18
FIVHA7		7		10	17
Grand Total	42	62	35	316	455
Average per UoM	7	10	6	53	76

Notes: The total includes measures assigned to more than one measure type.
No measures were categorised as critical.

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



Notes: The total includes measures assigned to more than one measure type.
No measures were categorised as critical.

Timetable

In the reporting sheets, Finland has reported information about the timetable of all measures. However, the information given does not seem to refer to a projected timeline, rather, dates are given for previous milestones (e.g. public consultations) suggesting there might have been a misunderstanding of the reporting template. Nonetheless, information about timetables for the implementation of the measures are reported in the FRMPs, as explained in section 4.

Measure details: authorities

Member States were requested to provide information on:

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

Finland completed these fields for all measures. 288 different authorities were named, making a quantitative assessment of the name of authorities difficult. Note also that measures reported more than one responsible authority, creating some double counting and making the aggregation of the data difficult. Overall, the most measures reported municipal and regional authorities as the responsible authorities, some measures reported also national or UoM authorities as the responsible authorities.

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 whose answers are not analysed here.

The progress of implementation was reported as⁴¹:

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

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

⁴¹ Guidance for Reporting under the Floods Directive (2007/60/EC):
<https://circabc.europa.eu/w/browse/a3c92123-1013-47ff-b832-16e1caaaf9a>

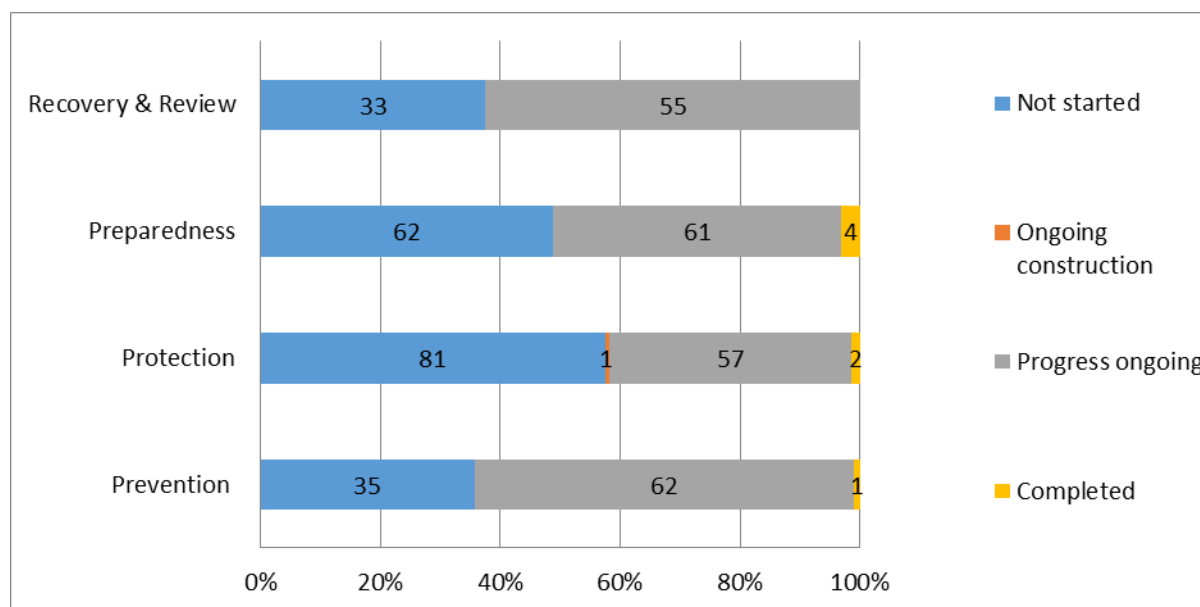
Table A7: Progress of implementation by measure aspect

	Not Started	On Going Construction	Progress On Going	Completed	Grand Total
Prevention	35		62	1	98
Protection	81	1	57	2	141
Preparedness	62		61	4	127
Recovery & Review	33		55		88
Grand Total	211	1	235	7	454

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

The original data reports one measure as both completed and not started, this measure was excluded from the analysis, hence only 454 measures are analysed for the progress of implementation.

Figure A7: Visualisation of Table A7: Progress of implementation by measure aspect



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

The original data reports one measure as both completed and not started: this measure was excluded from the analysis, hence only 454 measures are analysed for the progress of implementation.

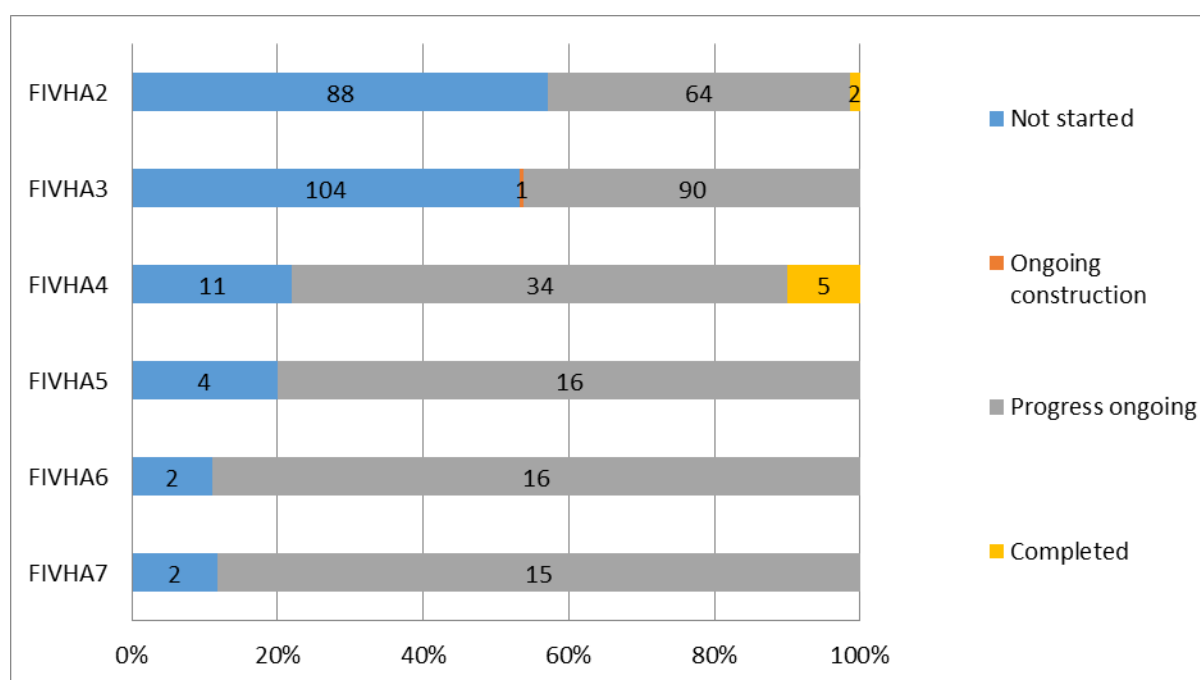
Table A8: Progress of implementation by UoM

	Not started	Ongoing construction	Progress ongoing	Completed	Grand Total
FIVHA2	88		64	2	154
FIVHA3	104	1	90		195
FIVHA4	11		34	5	50
FIVHA5	4		16		20
FIVHA6	2		16		18
FIVHA7	2		15		17
Grand Total	211	1	235	7	454
Average per UoM	35	<1	39	1	76

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

The original data reports one measure as both completed and not started: this measure was excluded from the analysis, hence only 454 measures are analysed for the progress of implementation.

Figure A8: Visualisation of Table A8: Progress of implementation by UoM



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

The original data reports one measure as both completed and not started, this measure was excluded from the analysis, hence only 454 measures are analysed for the progress of implementation.

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 finalised.
- 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.
- 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.

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).

Finland did not provide information about ‘other Community Acts’ in the reporting sheets. Nevertheless, it reported information for almost all measures under “Other Description”, this information could not be aggregated in categories.

Annex B: Definitions of measure types

Table B1 *Types of flood risk management measures⁴²*

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

⁴² Guidance for Reporting under the Floods Directive (2007/60/EC):
<https://circabc.europa.eu/w/browse/a3c92123-1013-47ff-b832-16e1caafc9a>

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, 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-naturalisation	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