

## 138. Implementation of EU Floods Directive in Finland – lessons learned and steps towards resilient planning

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European Union Floods Directive required member states to prepare preliminary flood risk assessment, flood maps and flood risk management plans by the end of 2015. The process will be reviewed every six years. The first cycle was a good learning experience and it is good to document, review and develop the planning process before the next cycle.

In order to find out the most important development needs for governance, tools and guidance, national flood risk coordination group launched questionnaire and round-up discussions in the beginning of 2016.

Questionnaire was targeted to all stakeholders involved in the planning process, for example regional environment authorities, regional councils, municipalities, rescue services and consultants. Feedback was discussed further in a workshop and formulated in to a lessons learned document.

The preliminary flood risk assessment was done with a nationwide automatized general fluvial flood mapping tool. The tool utilized an accurate elevation model, building register and probability analysis for flood levels. Risk squares defined by the rescue authority were produced based on the mapping results (Figure 1). The final decision of significant flood risk areas was made by using preliminary maps together with other available data. Pluvial floods were not covered in this detail on the first cycle, but a method to cover them is now under development. No significant flood risk areas were named on due to pluvial flood risk. In future, preliminary surface water flood maps for population centres will give all municipalities a better and equal starting point for pluvial flood risk assessment. In Finnish legislation pluvial and coastal flood risk management are for regional governmental authorities whereas fluvial floods are for municipalities.

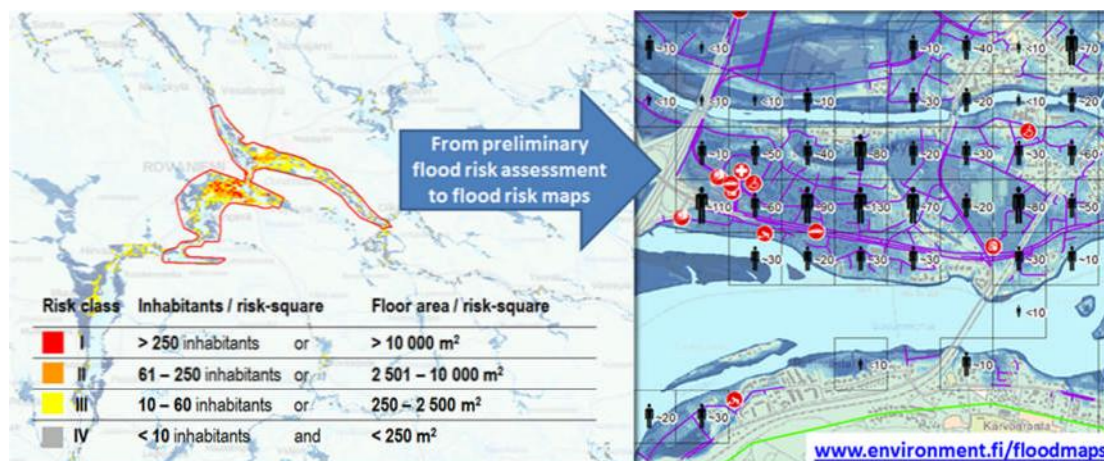


Figure 1. Criteria for risk-squares and an example about the flood risk map.

Based on the preliminary flood risk assessment by 13 regional Centres for Economic Development, Transport and Environment, the Ministry of Agriculture and Forestry named 21 areas of potential significant flood risk and regional flood risk management groups. Groups were formed by regional councils. Key authorities of the Finnish flood risk management are presented in Figure 3.

### Finland's Areas of Potential Significant Flood Risk & Flood Risk Management Planning Areas (12/2019)

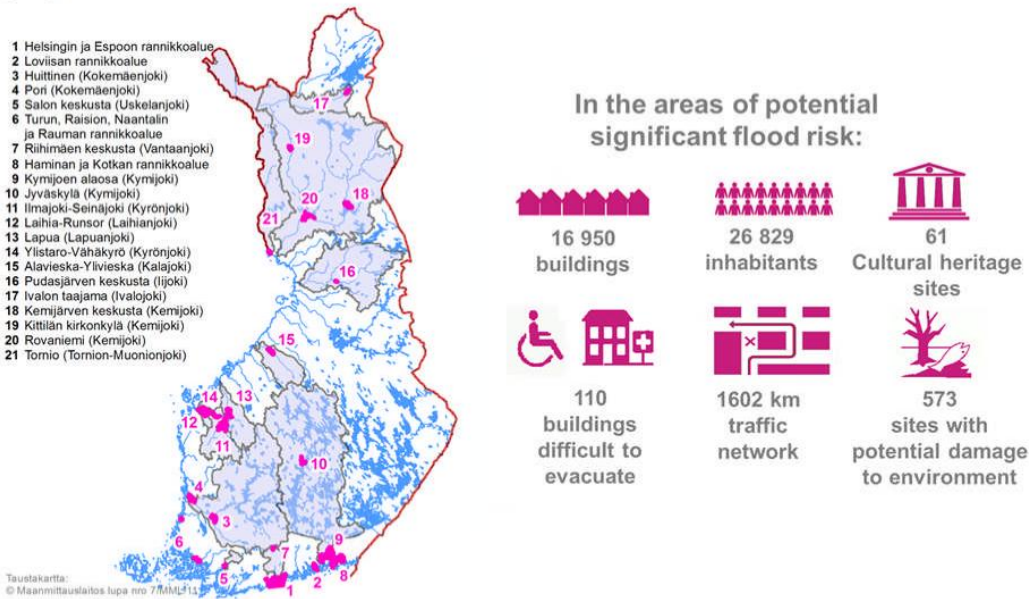


Figure 2. Finland's areas of potential significant flood risk, flood risk management planning areas and combined key figures. Figures are based on the estimation of the consequences of an extreme flood.



Figure 3. Key authorities and their roles in the Finnish flood risk management planning

Flood mapping was done with detailed elevation model (a 2m LiDAR elevation model is freely available for 90

% of Finland's area) and hydraulic modelling was used for rivers. Perceiving uncertainties, climate change impacts and special scenarios like ice break up jams and levee failures will be covered more closely on the next cycle. Pluvial flood modelling and risk mapping procedure must be created. Outsourcing the flood mapping and risk management plan writing is ought to increase according to past experiences and estimated governance resources available, so emphasis must be put on documentation, criteria and instruction. Maps will be delivered to Finnish Environment Institute which will publish them on the Flood map service and report them further to EU. Stakeholder feedback indicated, that there might be a need for simplified flood maps for public while the current maps could be used for planning. Finalising all maps in Finnish Environment Insitute could save resources.

There was a common framework for **flood risk management plans** consisting of table of context and general texts. This divided opinions, as some experienced this straightforward and easy while others considered this restricting and heavy. Plans became quite extensive as they were supposed to be up-to-date compilations of all flood plans in the river basin area. An effort has to be made to lighten the plan while keeping all the required content. One option is to screen out nationwide parts and process descriptions. Another solution could be compressing the essential to a public-friendly summary and attach else as appendices.

It was realised early that plans were not any good for public hearing in terms of promoting flood awareness and individual preparedness. For this purpose a joint effort was made together with river basin management planning and marine planning. Public hearing was done simultaneously under a common slogan, #vaikutavesiin ("act for waters") and a webpage which had popularised language together with map service and links to plans and feedback forms. As this didn't lead to significant amount of public feedback, news threshold was however exceeded. This good co-operation is going to be continued.

Joint planning between river basin management was limited to information exchange, cross-evaluation of the measures and simultaneous public hearing. These planning frameworks will most likely remain separate, as river basin management plans are even more comprehensive plans. Finnish flood risk management plans are quite locally concentrated and detailed, so flood issues would lose their weight on river basin management plans.

Perhaps the greatest needs for development and guidance are in setting objectives and assessing the effects and cost of proposed measures. Setting objectives for flood risk management was an iterative process as new information emerged when various accounts were completed. Some considered flood risk objects were identified too late whereas some felt lack of flood expertise and politicking hampered the work. Flood groups received a guideline document for objective setting from the national coordination group, which was found very useful. All the objectives should be connected to adverse consequences defined in the national flood risk management act and be detailed and measurable.

To assess the measures, flood groups were provided multi-criteria decision analysis frameworks which were used by the majority. They were found to improve understanding and ease comparison between different

alternatives. It is very important to have a transparent assessment process. For the next cycle, measures must be climate proofed and they must be reflected against different flood probabilities and uncertainties.

For the cost estimation of the measures there will be more information based on the first cycle. A cost estimation tool should be expanded to include non-structural measures and indirect costs.

Table 1 summarises development needs for the next cycle.

Table 2. Summary of development needs for the next cycle.

<p><b>General pluvial flood map product for preliminary flood risk assessment (PFRA)</b></p> <ul style="list-style-type: none"> <li>• municipalities are responsible for pluvial PFRA, but they do not necessarily have resources or equal starting points for this</li> <li>• pluvial floods cause more and more adverse consequences, while municipalities often don't have methods and knowledge to prepare for those</li> </ul>
<p><b>Assessment of climate change, future land use planning and uncertainties throughout the planning process</b></p> <ul style="list-style-type: none"> <li>• as flood risk management consists of consecutive analyses from historical observations to future projections, decision-making process should be aware of uncertainties</li> </ul>
<p><b>Improvement of flood maps</b></p> <ul style="list-style-type: none"> <li>• pluvial flood hazard and risk map development and guidance</li> <li>• dealing and visualising uncertainties</li> <li>• mapping of indirect/economic consequences</li> <li>• special scenarios (ice jam, levee overtopping)</li> <li>• more simple layout for public flood awareness</li> <li>• review of other communication methods than maps</li> <li>• common flood map for entire coast with dense intervals (10-20cm)</li> </ul>
<p><b>Development of hydraulic modelling and flood mapping guidance</b></p> <ul style="list-style-type: none"> <li>• use of consultants might increase, varying expertise within consultants</li> <li>• proper and common modelling criteria is not available at the moment</li> </ul>
<p><b>Improving flood risk management plan outline and guidance</b></p> <ul style="list-style-type: none"> <li>• current plans are too heavy, they need focus locally and to objects and measures</li> </ul>
<p><b>More understandable flood risk management (FRM) objectives</b></p> <ul style="list-style-type: none"> <li>• connecting FRM objectives to adverse consequences and local flood risk</li> </ul>
<p><b>Development of evaluation methods for measures</b></p> <ul style="list-style-type: none"> <li>• transparent and neutral multi-criteria decision analysis framework</li> <li>• improvement of cost-benefit and impact analysis (review of unit costs – also for non-structural and continuous measures)</li> <li>• development of explicit prioritisation framework for measures</li> </ul>
<p><b>Early attention to river basin management planning (RBMP)</b></p> <ul style="list-style-type: none"> <li>• Flood group should have a permanent RBMP member</li> <li>• joint method and planning framework development</li> <li>• joint communication</li> </ul>
<p><b>More effective knowledge sharing and support to regional level</b></p> <ul style="list-style-type: none"> <li>• flood groups may have members with limited flood expertise</li> <li>• information sharing increase understanding and mutual trust</li> <li>• centralized preparation of common materials and information</li> </ul>
<p><b>Public hearing</b></p> <ul style="list-style-type: none"> <li>• search of ways to communicate FRM interestingly and promote especially public awareness and preparedness</li> <li>• deepening of co-operation with RBMP and marine planning</li> <li>• consulting communication experts (no engineer talk, clear and uniform message)</li> </ul>
<p><b>Promoting flood risk management in areas not identified as significant</b></p> <ul style="list-style-type: none"> <li>• floods may occur anywhere and this concept is applicable for all FRM</li> </ul>