



Rovaniemi

Floods and protection in Rovaniemi



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Rovaniemi

Rovaniemi

- area 8000 km², population 60 000
- located at the Arctic Circle and at the convergence of the Ounasjoki and Kemijoki rivers





Major floods caused by

- Meltwaters
- Heavy rains
- Frazil ice and slush dams
- Combinations of the above mentioned
- Dam break
- Stormwater floods

Last major flood 1993 (1943, 1966, 1967, 1973, 1981)





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Predicted effects of the Climate Change in Rovaniemi (Clim-Atic)

- Snow amounts decrease, shorter snow cover season
- Summers 2-3 and winters 4-5 degrees warmer, precipitation estimated to increase esp. in the winter
- Impacts on floods minor, Changes in flood magnitudes rather small, in Kemijoki
 - Decrease or stay unchanged in 2010-39
 - Decrease or stay unchanged in 2040-69
- In Ounasjoki
 - Stay unchanged (even increase) in 2010-39
 - Stay unchanged or decrease in 2040-69

(Veijalainen / Clim-Atic)





What has been done?

- Flood hazard mapping Saarenkylä 2003, all suburban areas 2007
- EU Floods Directive 2007. The city submitted the Regional Council of Lapland to launch an overall flood risk management plan -> Kemi Ounasjoki Task Force
- Target area of the Clim-Atic research project (2008-10), identified impacts of climate change especially in northern areas
- General Plan for Limiting Damage Caused by Floods in the Suburban Areas of Rovaniemi 2009
- "Measures for large floods have tentatively been planned, but few flood protection measures have yet been implemented."





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Protection alternatives (Clim-Atic 2010)

- Flood embankments
- Dredging
- Flood Water Retention in the River Basin
- New regulation orders
- Temporary flood protection structures
- Developing flood protection communication and co-operation between all actors

A combination of different alternatives could be the best choice in flood protection

(Clim-Atic)





The primary alternative

- Flood Water Retention in the River Basin
- Interim report of the “Kemi Ounasjoki Task Force”. Regional Council of Lapland’s submission approved by the City Council (June 2008). The primary alternative Kemihaara pool construction.
 - most economical and efficient alternative to flood risk reduction in Rovaniemi
 - additional benefits e.g. hydropower potential
 - could reduce the discharge of the Kemijoki by 1,000 m³/s in Rovaniemi during a 10-day extreme flood, and thus decrease the water level in Rovaniemi by appr. 1 metre.





Other alternatives

- Flood Risk Management Plan
 - Lapland's ELY-centre (ex-Regional Environmental Center) and the City of Rovaniemi in co-operation
 - "target cards" based on practical experience from the previous floods
- Temporary flood protection structures
 - fast to assemble and useful in sudden floods
 - prevent the flood from spreading into a specific area.
- Developing flood communication / UR-FLOOD
 - Saarenkylä is a pilot community in an international research project (Understanding Uncertainty and Risk in communicating about FLOODs), the Finnish Environment Institute.
 - Project goal: to improve flood risk planning, the flow of information to the residents of the risk areas, and communications between officials and citizens.





Airborne laser scanning

- For more accurate elevation model
 - By National Land Survey of Finland
 - aimed at areas with high risk of flooding and on densely populated areas where accurate elevation data is most urgently required for compiling flood maps
 - 2011 in Rovaniemi 6000 km²
 - The elevation model (2m x 2m, resolution 30 cm) allows for more accurate modeling of flood events. Maps can be used to avoid the construction of flood hazard areas and to prepare emergency plans for large floods.





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Rovaniemi City Climate Programme

- focus on the city's own activities and questions influenced by the city
 - assembles different climate change measures already implemented in Rovaniemi
 - contains concrete proposals on the objectives and measures for the future
- brings national and provincial level climate targets to Rovaniemi



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Tack! Thank you!

