



CLIMATE CHANGE ADAPTION MEASURES IN THE CITY OF PORI

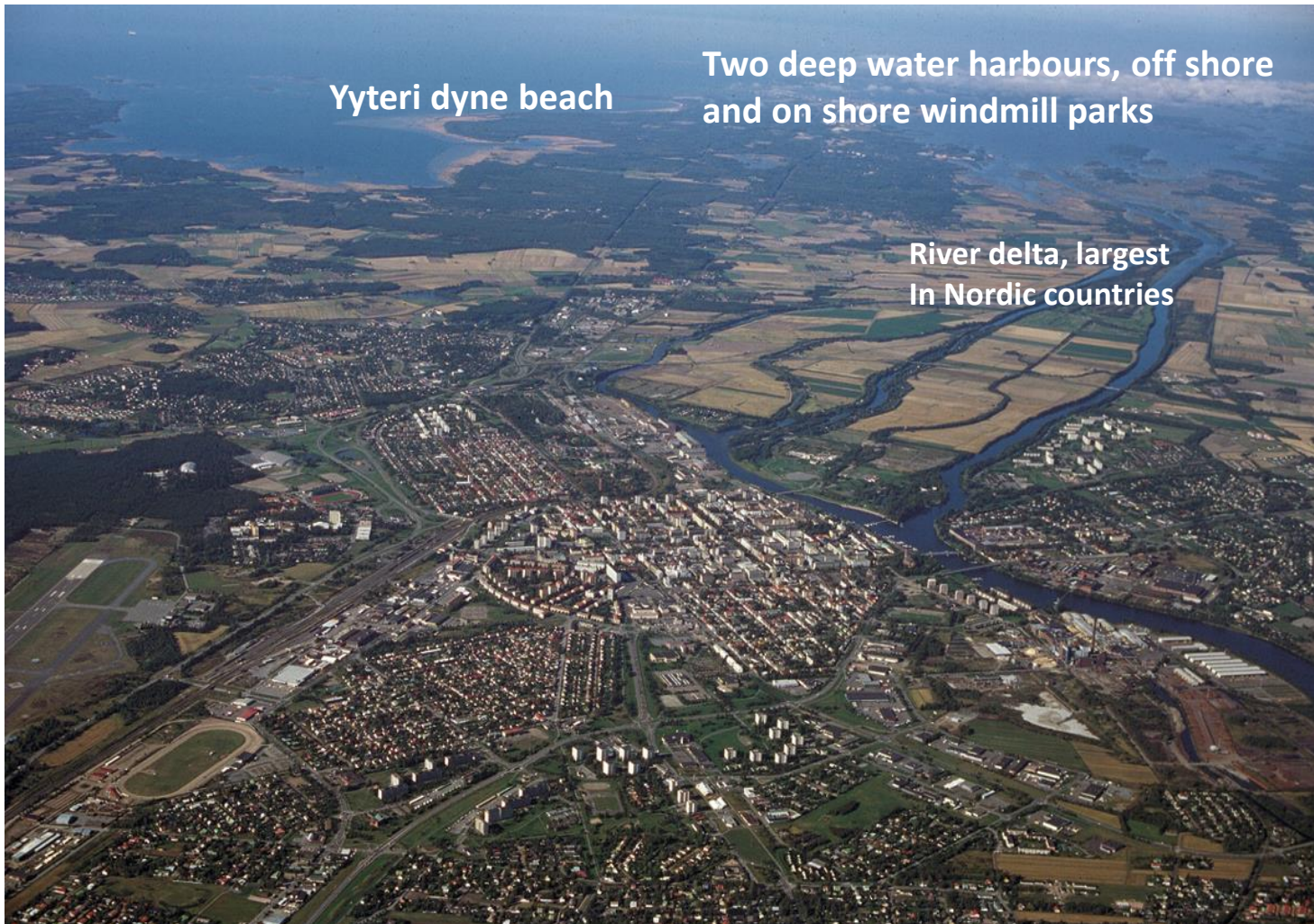
Tools for Urban Climate Adaption Training Days
Turku 29 th Nov 2017

PORI

Pori- city of sea
and river

Landscape like
Pancake,
highest hill 20 m

85 000
inhabitants
App 1/3 is living
in areas where
flooding is
possible



FIRST: Pori is fighting against climate change



- producing and using solar energy (PV and heat)
- producing and using wind energy
- energy savings, climate contracts
- using led street lamps
- using wise automation (lighting, ventilation, heating) in buildings
- no waste food, it's collected and given out
- reusing and recycling materials
- growing amount of biogas and electric cars
- improving light traffic, more than 200 km bike lanes

SECOND: Adaptation of Climate change

BY planning and building, by maintenance, by dredging

TO AVOID: Harmful and expensive consequences caused either river flooding or stormy rains

**PORI**

Flooding is not a new thing



Flooding map

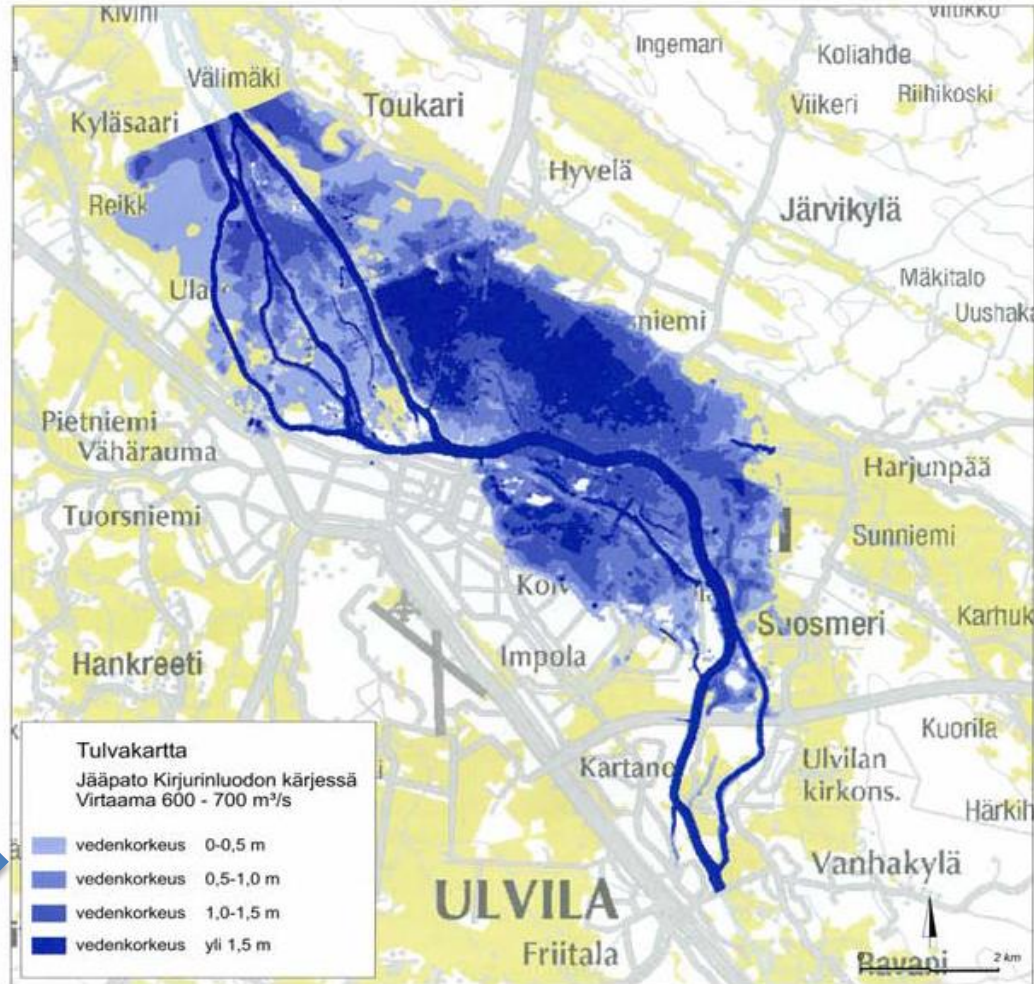
Scenario:

Block of ice at the peak of Kirjurinluoto causes water level to rise at the city center and residential areas

Flow rate 600-700m³/s

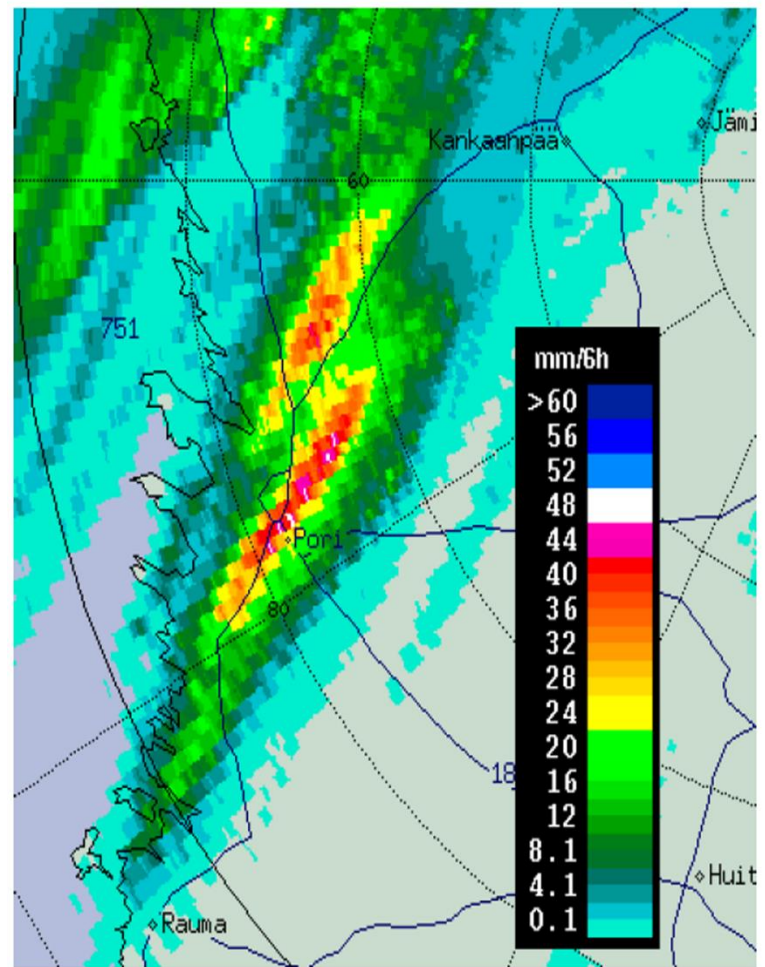
Water level:

- 0-0,5 m
- 0,5-1,0 m
- 1,0-1,5 m
- 1,5 m <



12th of August 2007

- It rained almost all day long
- Heavy rain started around 5 pm
- It kept raining three hours non-stop
- Rainfalls were changing
- Highest measured rainfall was 140mm in a private lot
- Usually it rains 72-80mm in August, yearly 515-725mm
- Rainfall area was very narrow strip of land in the center of Pori



rainfall and force of the rain





Underpasses and streets were flooding





Main underpass was so quickly filled with water that some cars were stuck there and you could see only roofs of cars

Also underground garages were filled so that tens of cars were damaged



Economical impacts of flood damage in Pori

- Insurance companies compensated 5,7M€ of 939 claims (demands over 8M€)
- Average compensation was 6150€, the highest 70240€
- City of Pori suffered 5M€ in properties and 1m€ in traffic infrastructure
- **Soon afterwards 4M€ was invested in preventing flood damages**



Climate change adaption measures in the City of Pori

Measure 1: retention ponds

- December 2007: Suntinoja (the ditch)
- Waterway was cleared from trees and other materials blocking water from running (same process is done afterwards in many important waterways around city)
- City is planning to build retention ponds or fences to block fertiles and solid material transfer to river



Before cleaning



After maintenance



On the left: Clearing of the waterway with heavy machines

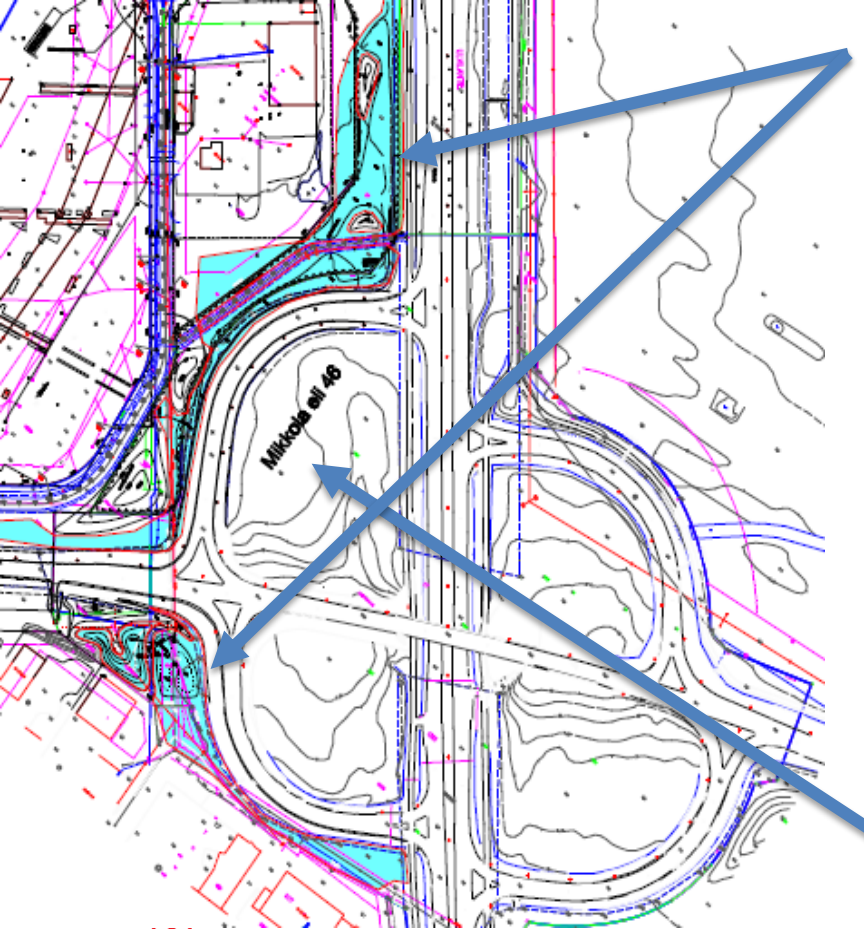
On the right: New pumping station was built. It's part of the draining system of Northern parts of City



Measure 2: reservoir for storm water

Mikkola:
A lot of
commercial and
industrial space,
an airfield,
motorways and
a small
residential area





Two reservoirs (light blue colors in the left picture) connected to collection pond are built to traffic greeneries. They hold 8600 m³ and 13 500 m³ of water.

Around them lies appr. 100 000 m² of buildings, parking areas and other water resistant structures.





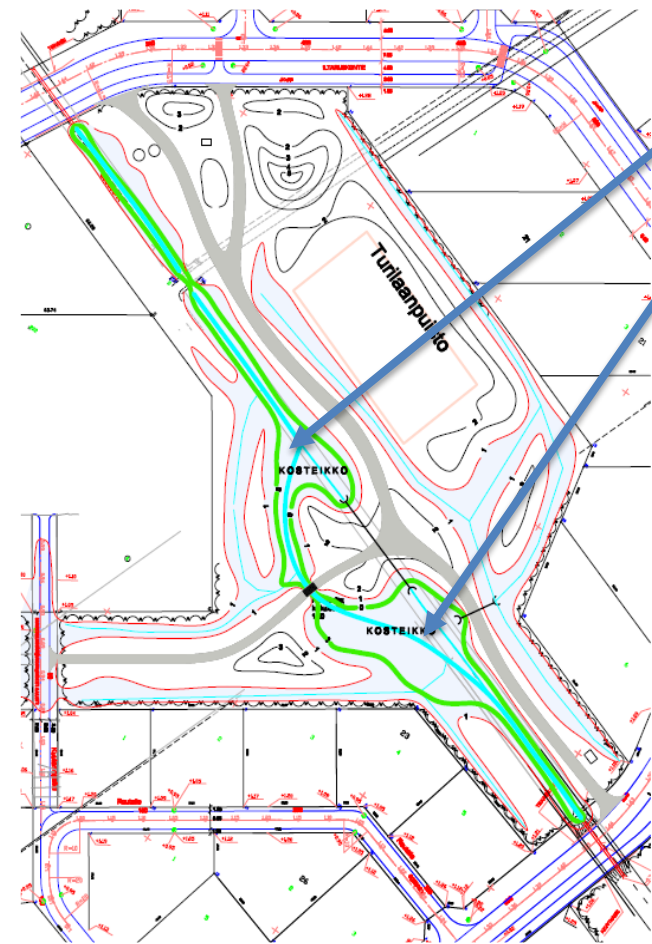
Measure 3: Ponds in urban parks

New residential area called Lotskeri suffered from floodings in 2007.

Local green area was not built yet, so it was a perfect place to try a new approach: a water element inside the park which would naturally retain water.



And here is result: Turilaanpuisto park where water will flow freely on waterways inside the park



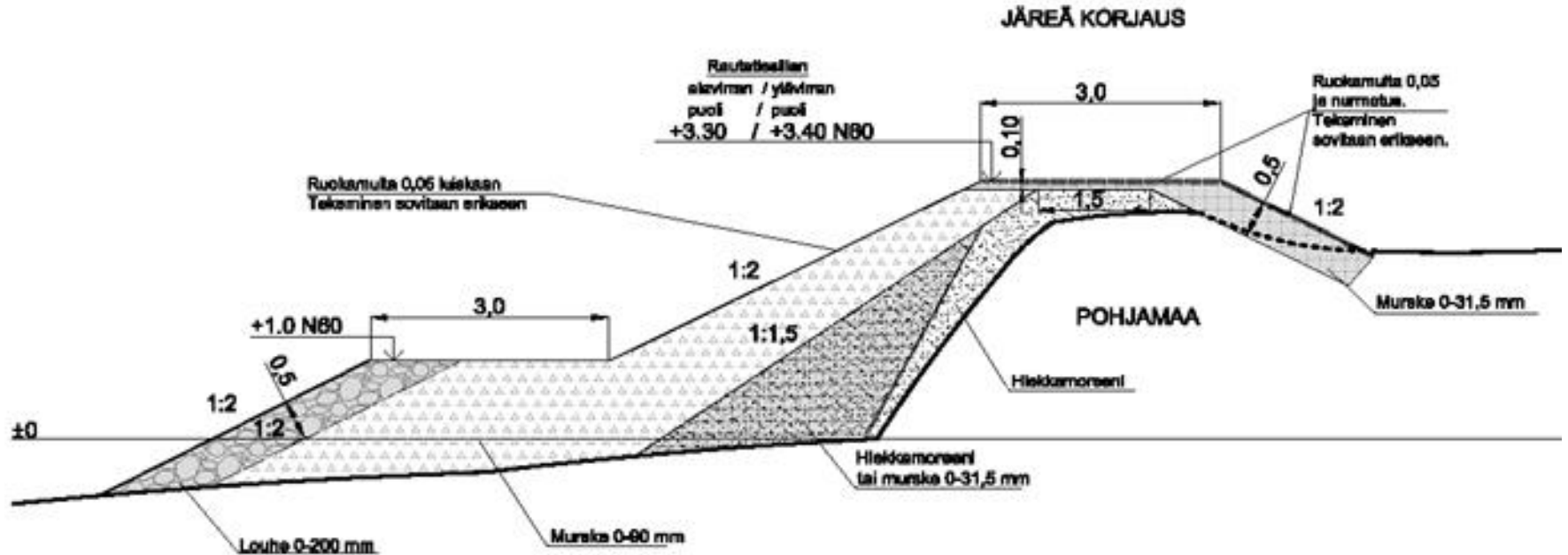
Like this it looked soon after building



And this is how area looks now. Photo was taken 20.11.2017.



Measure 4: Strengthening levees (shelters against river flooding), started 5 years ago and ongoing



Riverbanks of river Kokemäenjoki are typically low, levees add protection against flooding damages

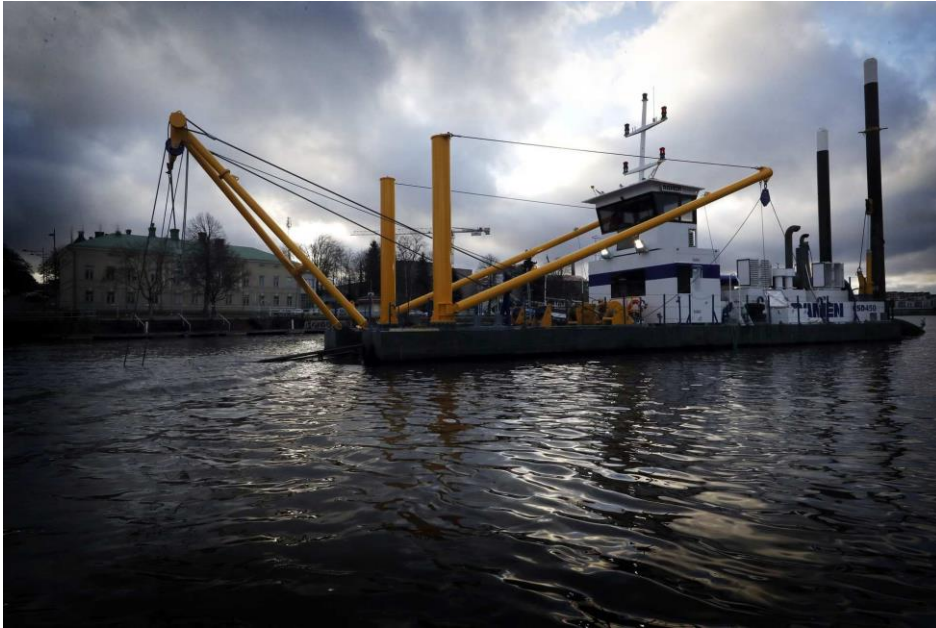


Levees can be used as a walking or biking lanes



Measure 5. Draining the river

Every 10-15 year river must be drained because so much solid material is coming down the river and concentrating places where river flow slows down.



Latest drainings in the river at the city centre was November 2017




PORI

Thank you for
listening

Matti Lankiniemi
Special supervisor
City of Pori, Corporative administration