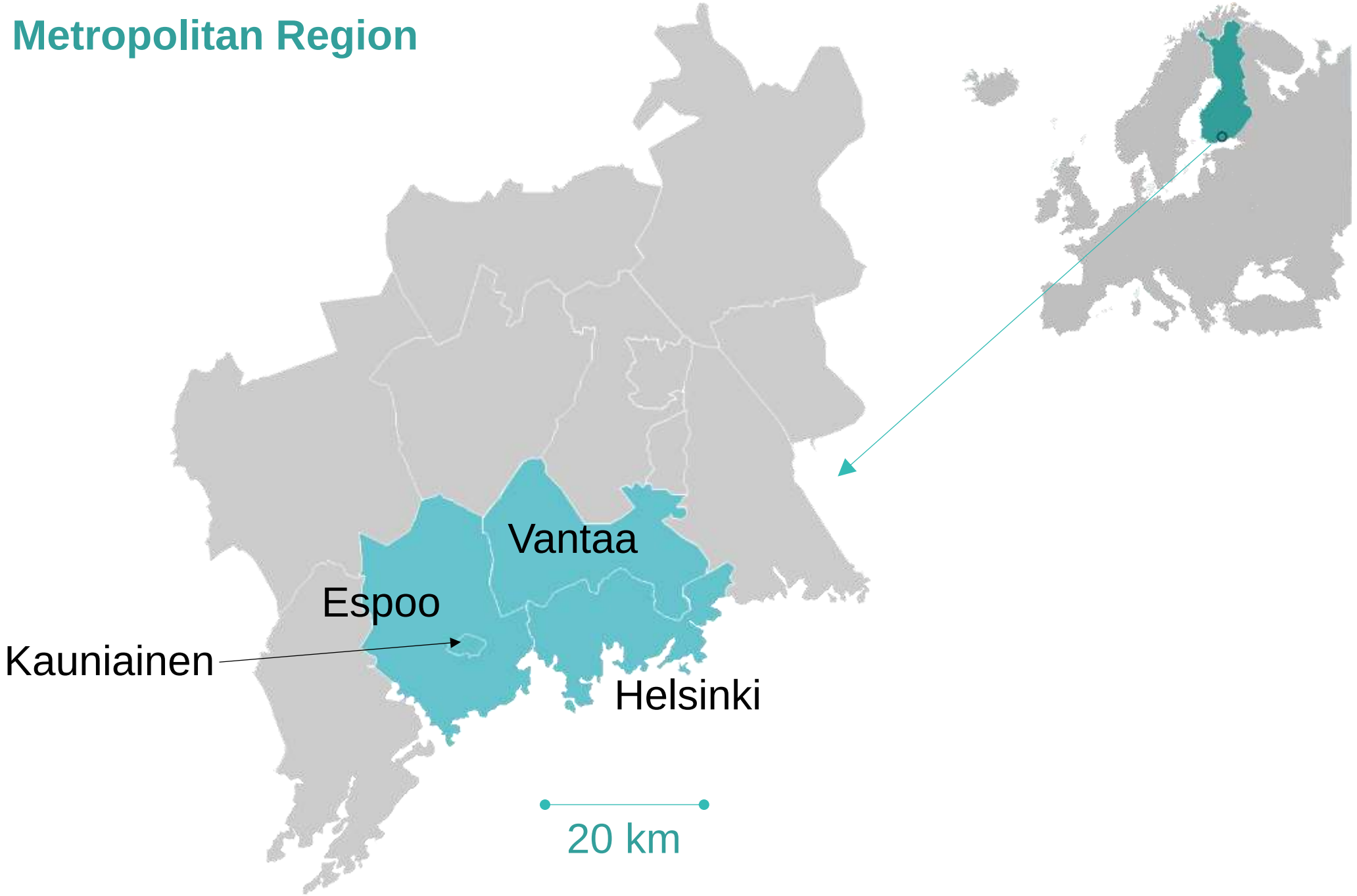
# Indicators for adaptation in the urban context: Case Helsinki Region

**Resilient Cities 2019**

Maaria Parry, Climate Specialist
Helsinki Region Environmental Services Authority

# Helsinki Metropolitan Region



## Climate Change Adaptation Strategy 2012-2020

- Annual monitoring reports
- *”What has been done to implement the strategy?”*

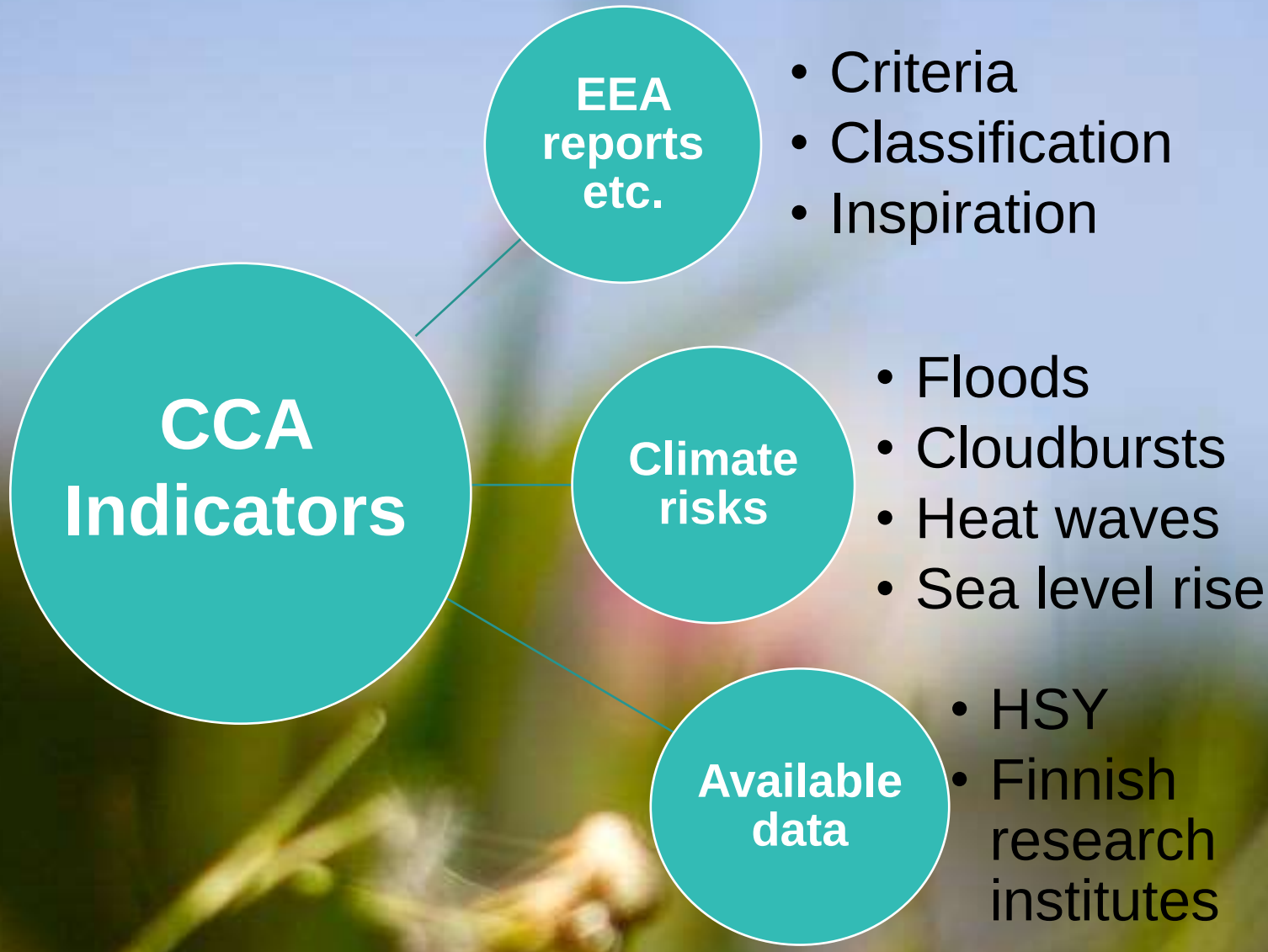
HSY

Helsinki Metropolitan Area Climate Change Adaptation Strategy

## CCA Indicators

- First reporting year 2019
- *”Are we adapting to climate change?”*

# Development of the adaptation indicators




- Criteria
- Classification
- Inspiration

- Floods
- Cloudbursts
- Heat waves
- Sea level rise

- HSY
- Finnish research institutes

# CCA indicators for the Helsinki Metropolitan Region

## Classification according to indicator content (EEA 2018)

### 1. Hazard indicators (1960-2018)

- Mean temperature; number of days exceeding 25 °C; yearly rainfall, cloudbursts (>20 mm per day); total snow mass; number of days when temperature passes 0 °C

### 2. Exposure indicators

- Number of residents in flood risk areas (coastal & fluvial, floods expected every 20, 50, 100 and 250 years)
- Number of constructions in flood risk areas (coastal & fluvial, floods expected every 20, 50, 100 and 250 years)
- Number of identified areas of pluvial floods

### 3. Adaptive capacity indicators

- The share of vegetation and impermeable land cover
- Number of green roofs
- Combined sewer overflows

### 4. Composite vulnerability indicators

4. Social vulnerability to heat waves
5. Social vulnerability to floods

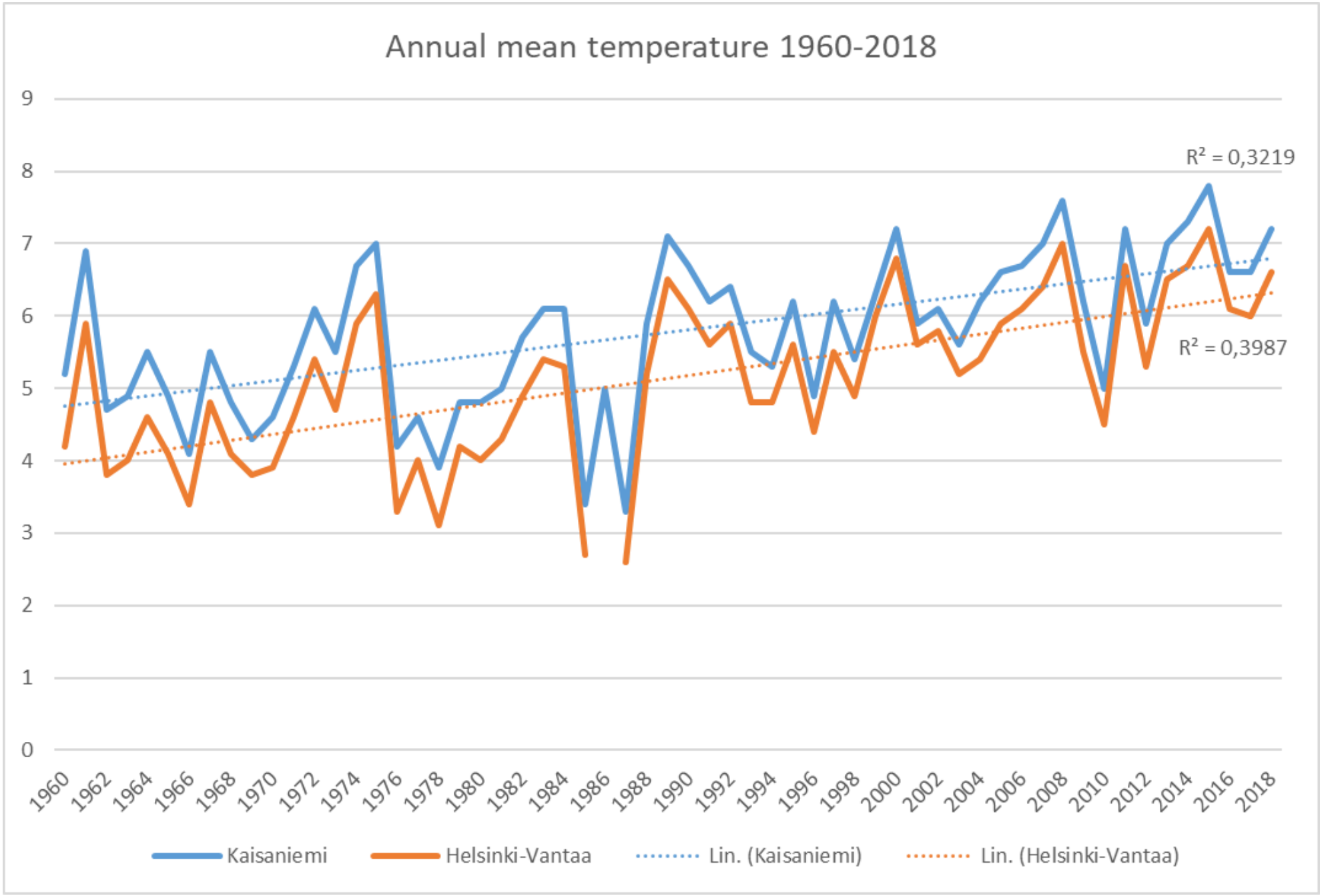
HSY

# CCA indicators for the Helsinki Metropolitan Region

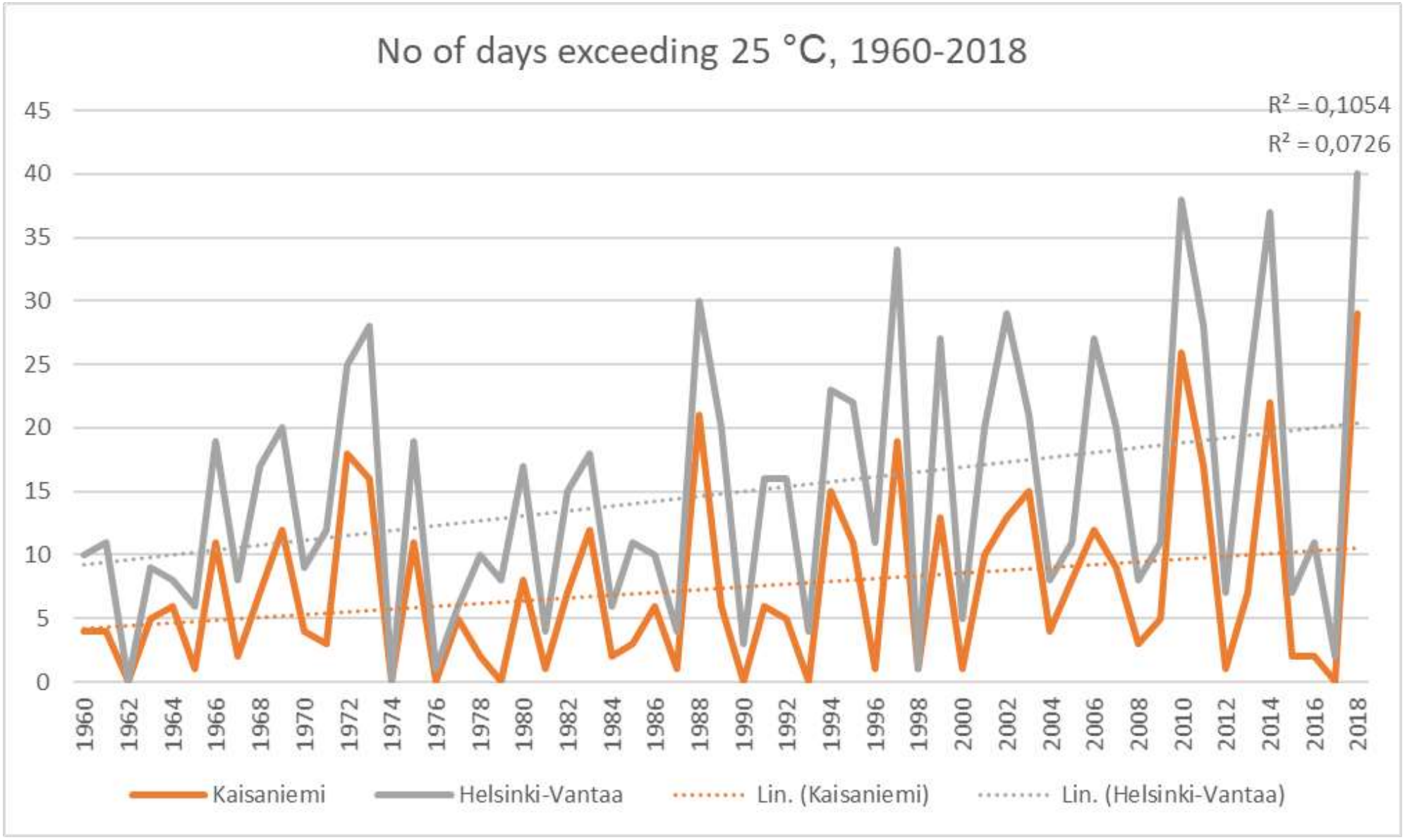
## Classification according to indicator content (EEA 2018)

- **Hazard indicators (1960-2018)**
  - **Mean temperature**, **number of days exceeding 25 °C**, **yearly rainfall**, cloudbursts (>20 mm per day), total snow mass, number of days when temperature passes 0 °C
- **Exposure indicators**
  - **Number of residents in flood risk areas (coastal** & fluvial, floods expected every 20, 50, 100 and 250 years)
  - **Number of buildings in flood risk areas (coastal** & fluvial, floods expected every 20, 50, 100 and 250 years)
  - Number of identified areas of pluvial floods
- **Adaptive capacity indicators**
  - **The share of vegetation and impermeable land cover**
  - Number of green roofs
  - **Combined sewer overflows**
- **Composite vulnerability indicators**
  - Social vulnerability to heat waves
  - Social vulnerability to floods

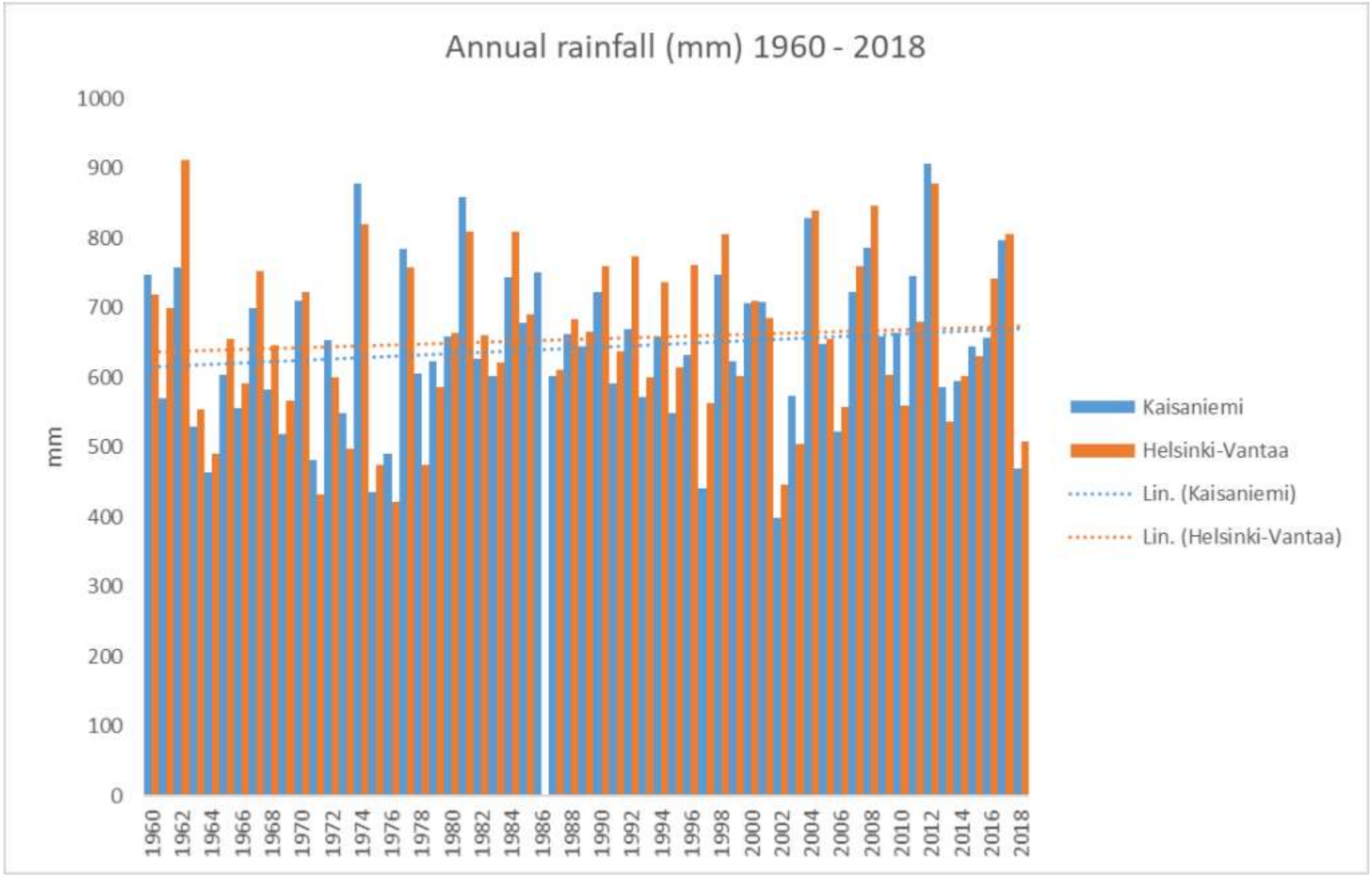
HSY


Annual mean temperature 1960-2018
9
8
7
6
5
4
3
2
1
0
R² = 0,3219
R² = 0,3987
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
Kaisaniemi
Helsinki-Vantaa
Lin. (Kaisaniemi)
Lin. (Helsinki-Vantaa)

HSY

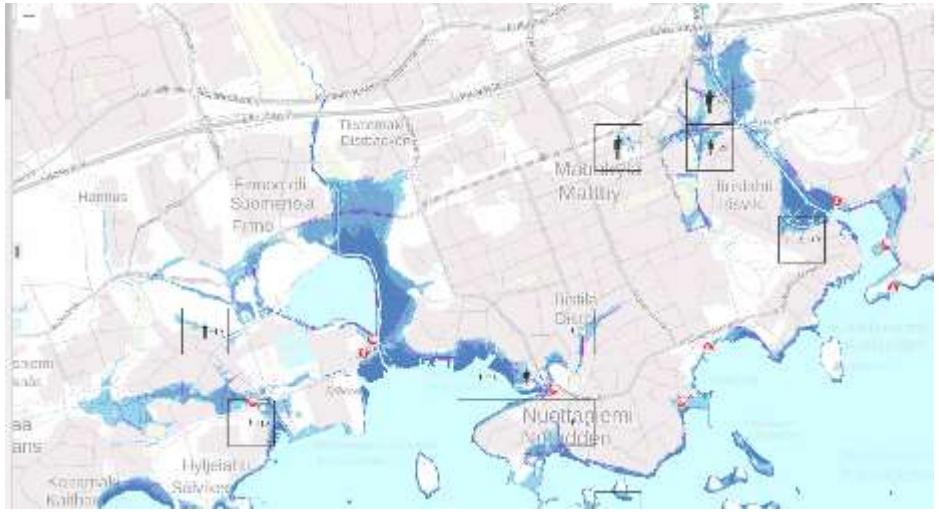

No of days exceeding 25 °C, 1960-2018
R² = 0,1054
R² = 0,0726
45
40
35
30
25
20
15
10
5
0
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
Kaisaniemi
Helsinki-Vantaa
Lin. (Kaisaniemi)
Lin. (Helsinki-Vantaa)

HSY


Annual rainfall (mm) 1960 - 2018
mm
1000
900
800
700
600
500
400
300
200
100
0
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
Kaisaniemi
Helsinki-Vantaa
Lin. (Kaisaniemi)
Lin. (Helsinki-Vantaa)

HSY

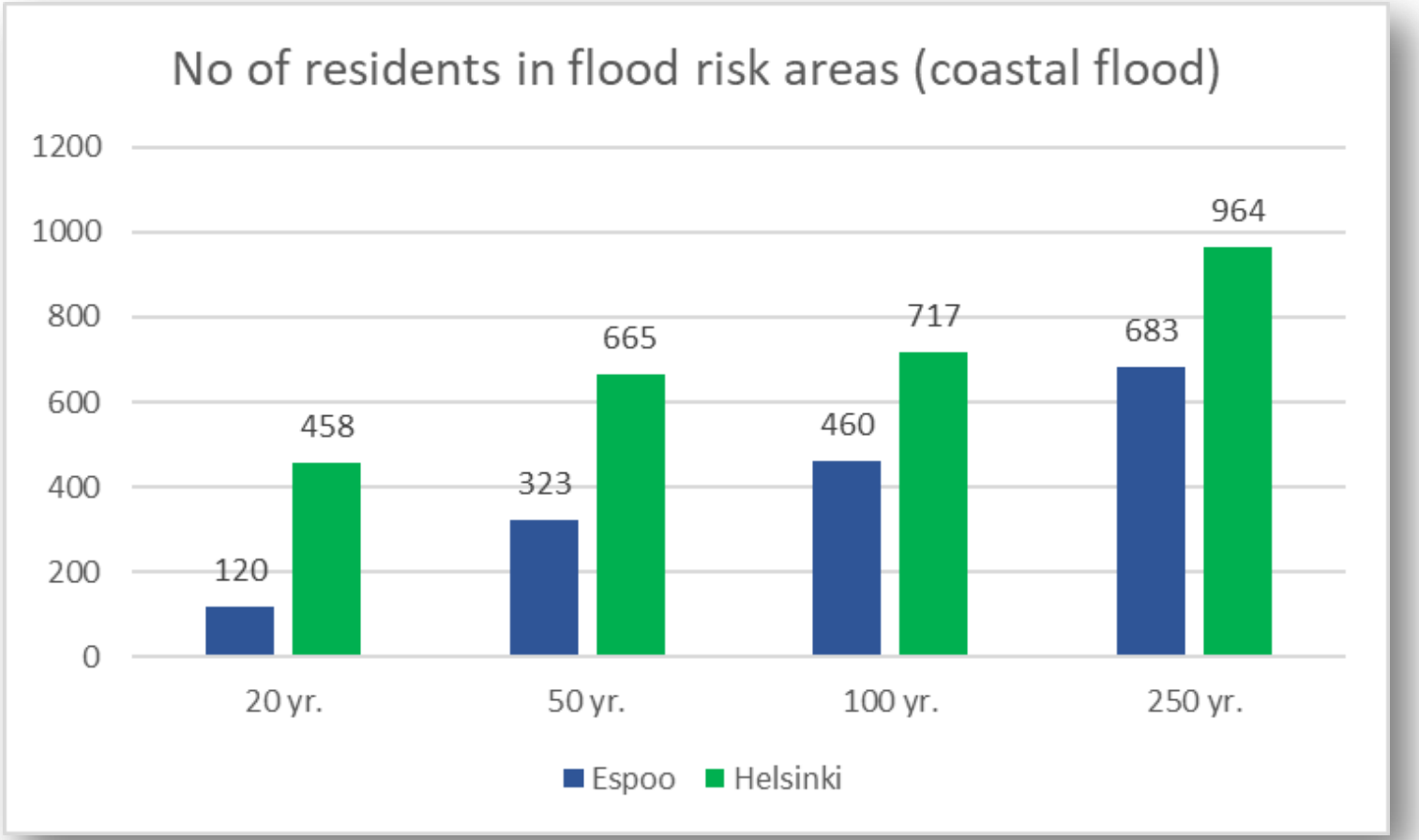
Flood risk maps
(Finnish Environmental Institute)

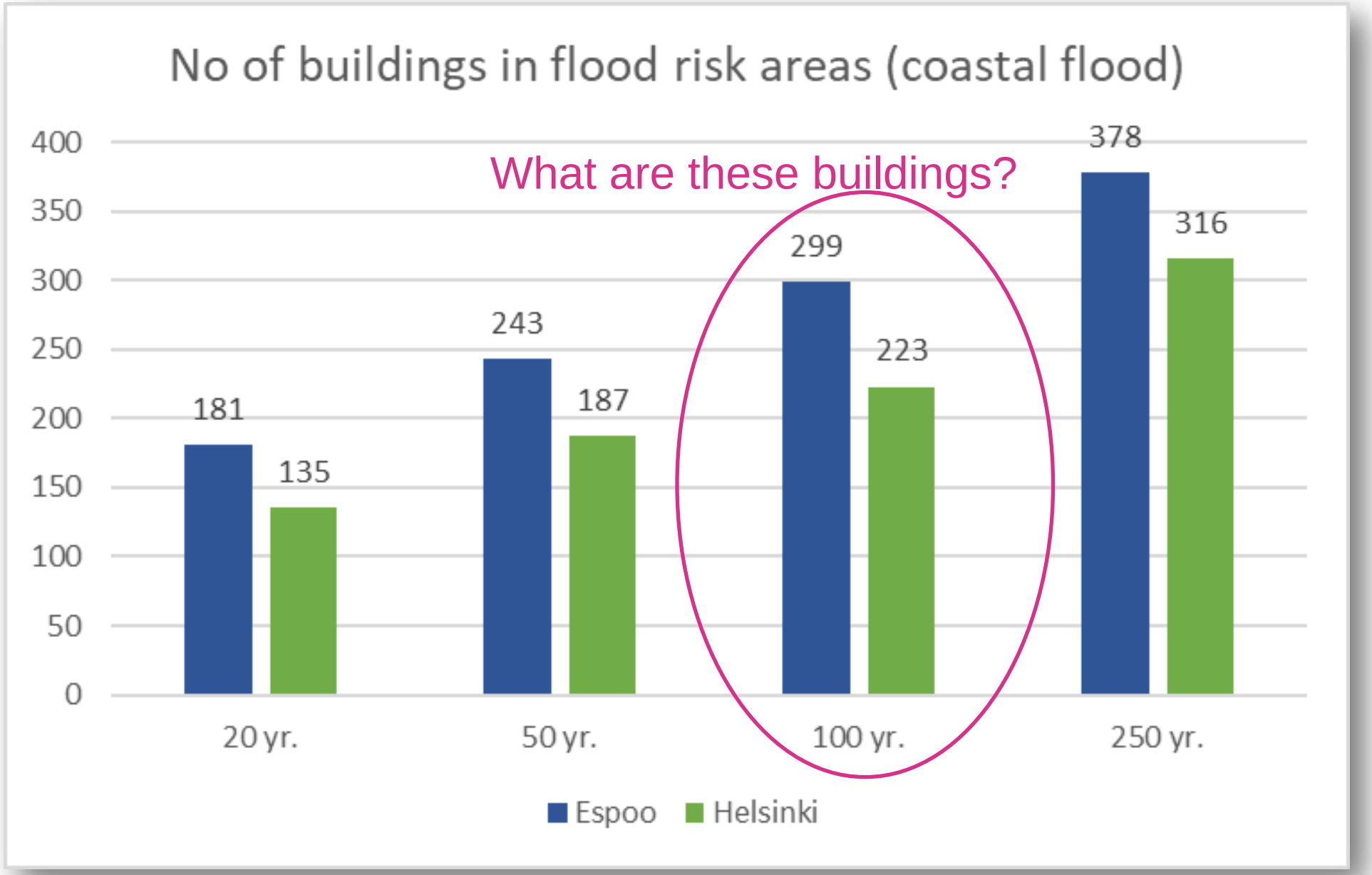


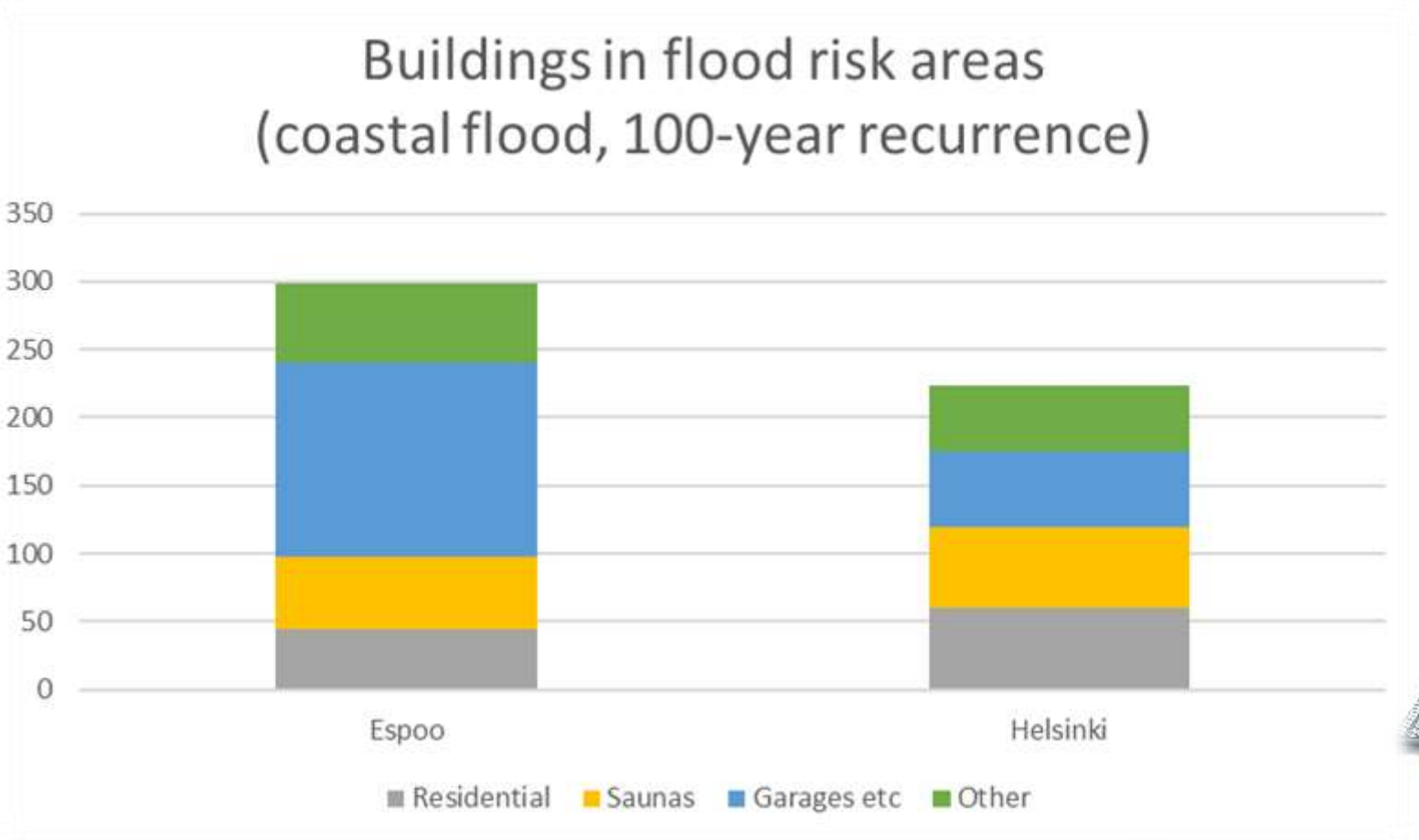
+

Regional basic register
(HSY)

## Number of residents in flood risk areas

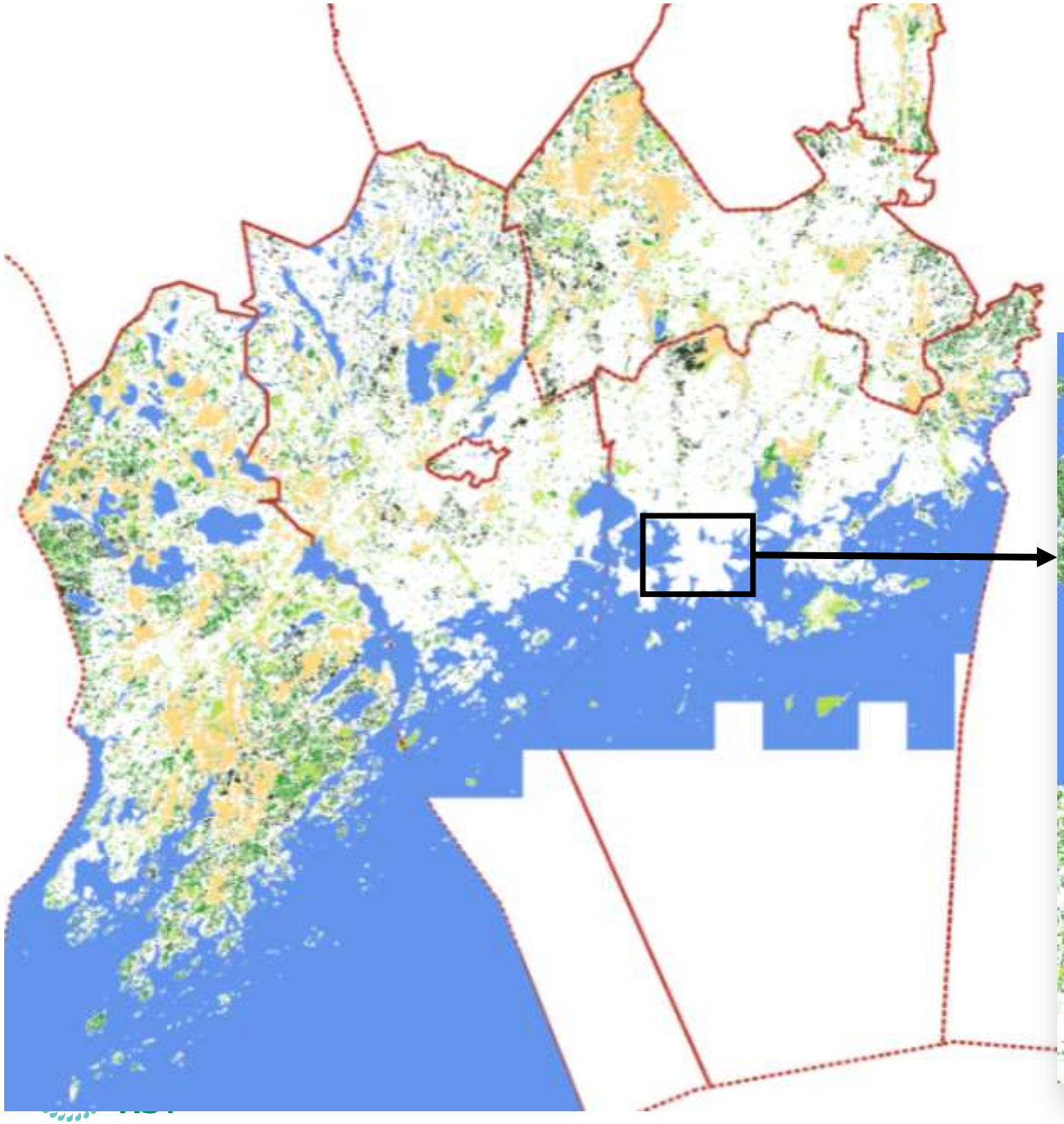



No of buildings in flood risk areas (coastal flood)
What are these buildings?
400
350
300
250
200
150
100
50
0
181
135
243
187
299
223
378
316
20 yr.
50 yr.
100 yr.
250 yr.
Espoo
Helsinki





# Regional land cover dataset

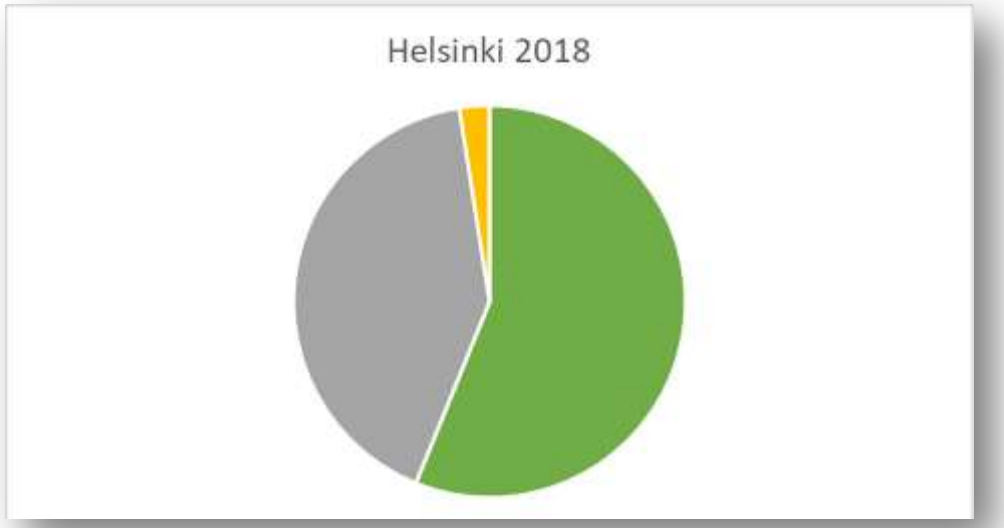


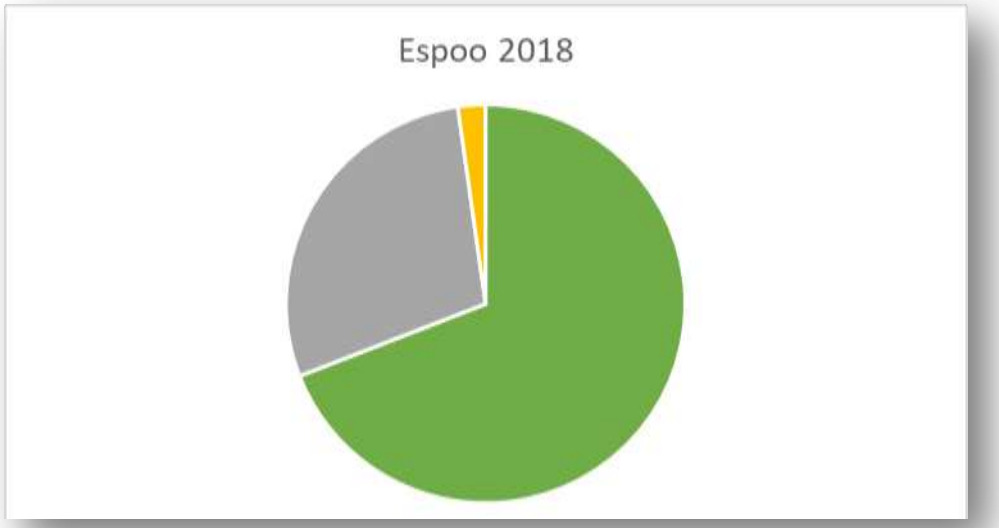
# Share of vegetation and impermeable land cover

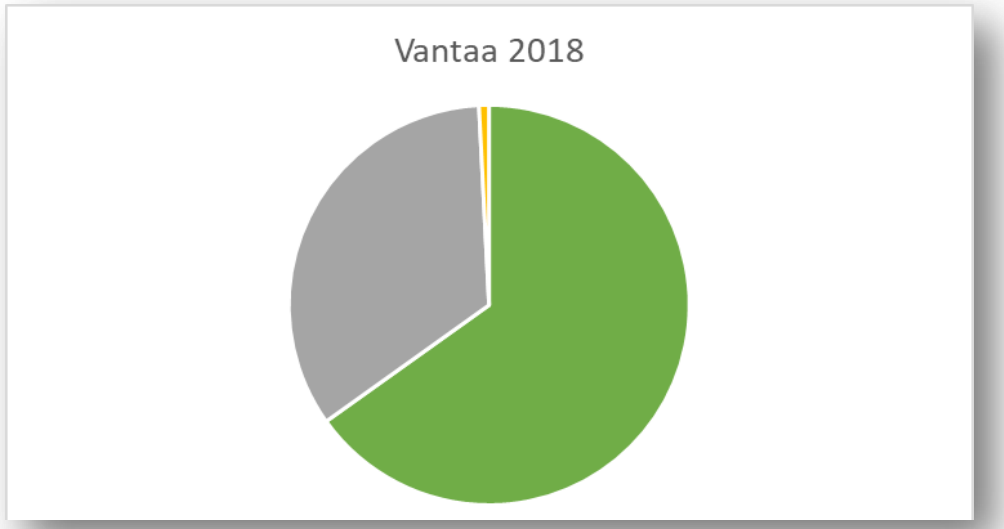
Vegetation

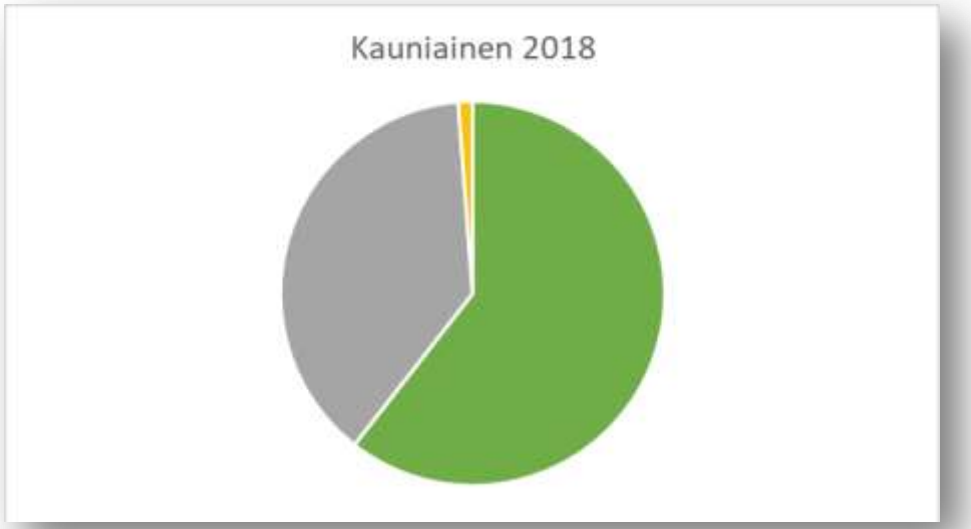
Impermeable land

Outcrop without vegetation



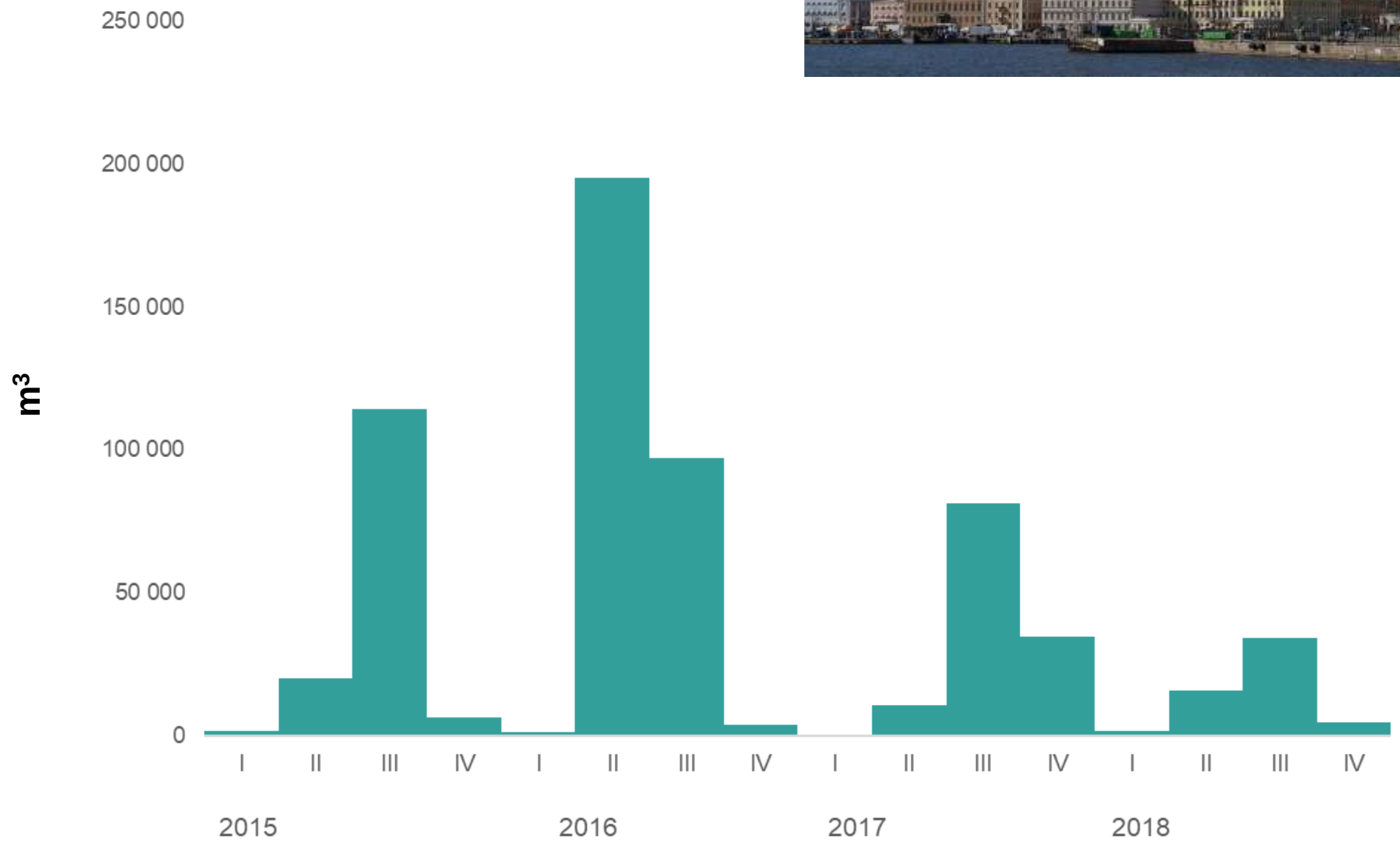



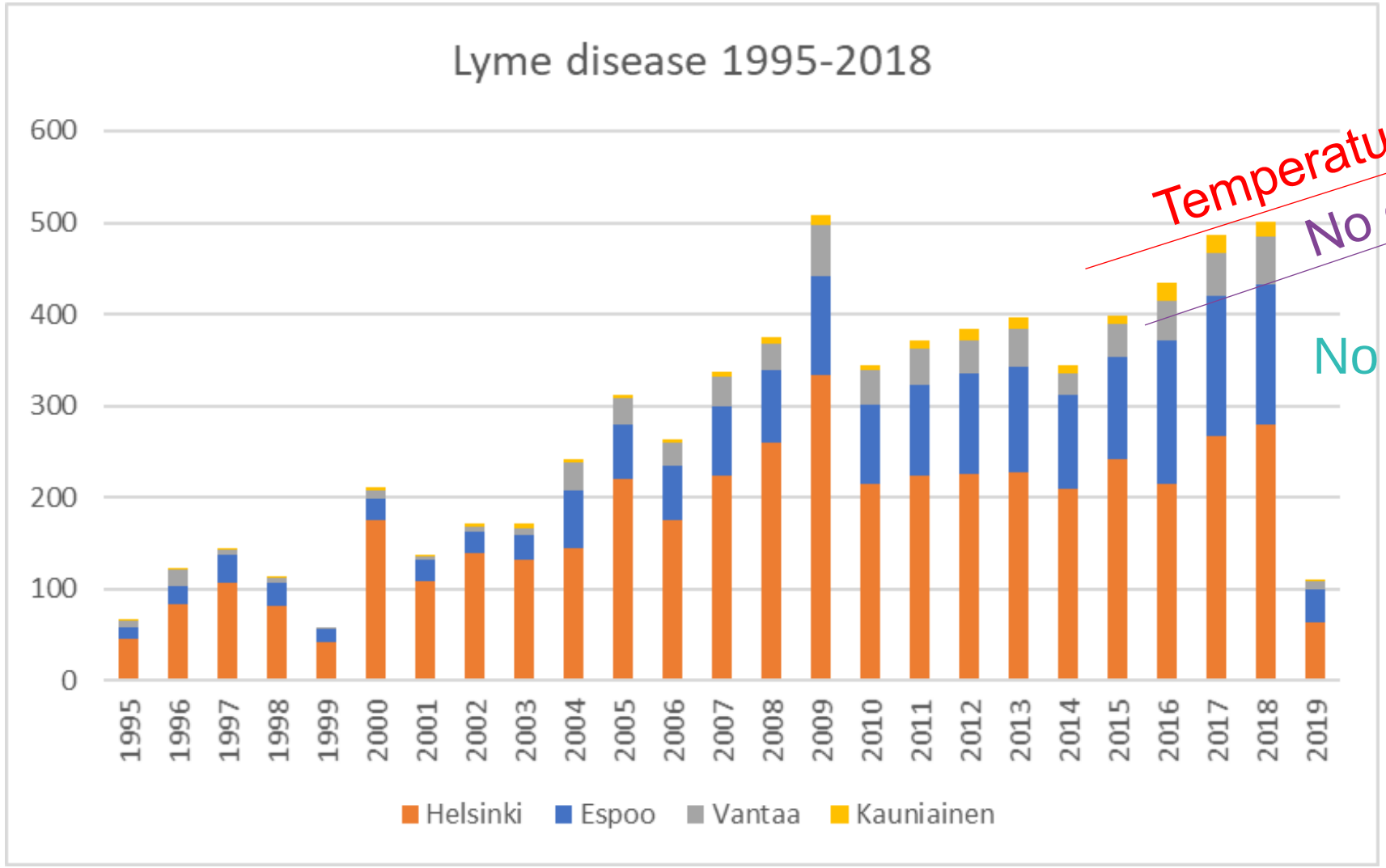




HSY

# Combined sewer overflows 2015-2018



# When do we see successful adaptation?




Adaptation measures

Temperature

No of ticks ?

?

No of infected people

HSY

# Lessons learnt

- Quality of data, timeliness
- Data protection regulation in the development of vulnerability indicators
- **CCA indicators do not show progress or trend over relatively short periods of time**
- How to measure e.g.
  - Impacts of heat waves?
  - Costs of adaptation vs non-adaptation?

**→ On-going process!**

HSY

# Thank you!

**maaria.parry@hsy.fi**

**Helsingin seudun ympäristöpalvelut -kuntayhtymä**
Samkommunen Helsingforsregionens miljötjänster
Helsinki Region Environmental Services Authority