Erfaringer med bruk av regnbed

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KLIMA2050

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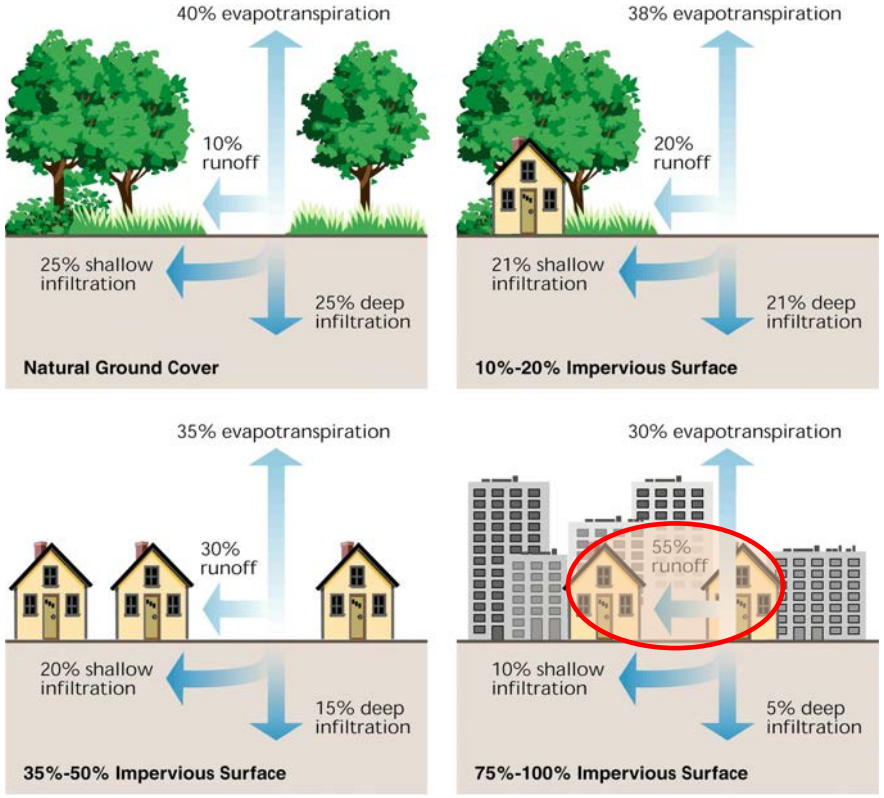
Urbanisering



Source: FISRWG (2001)

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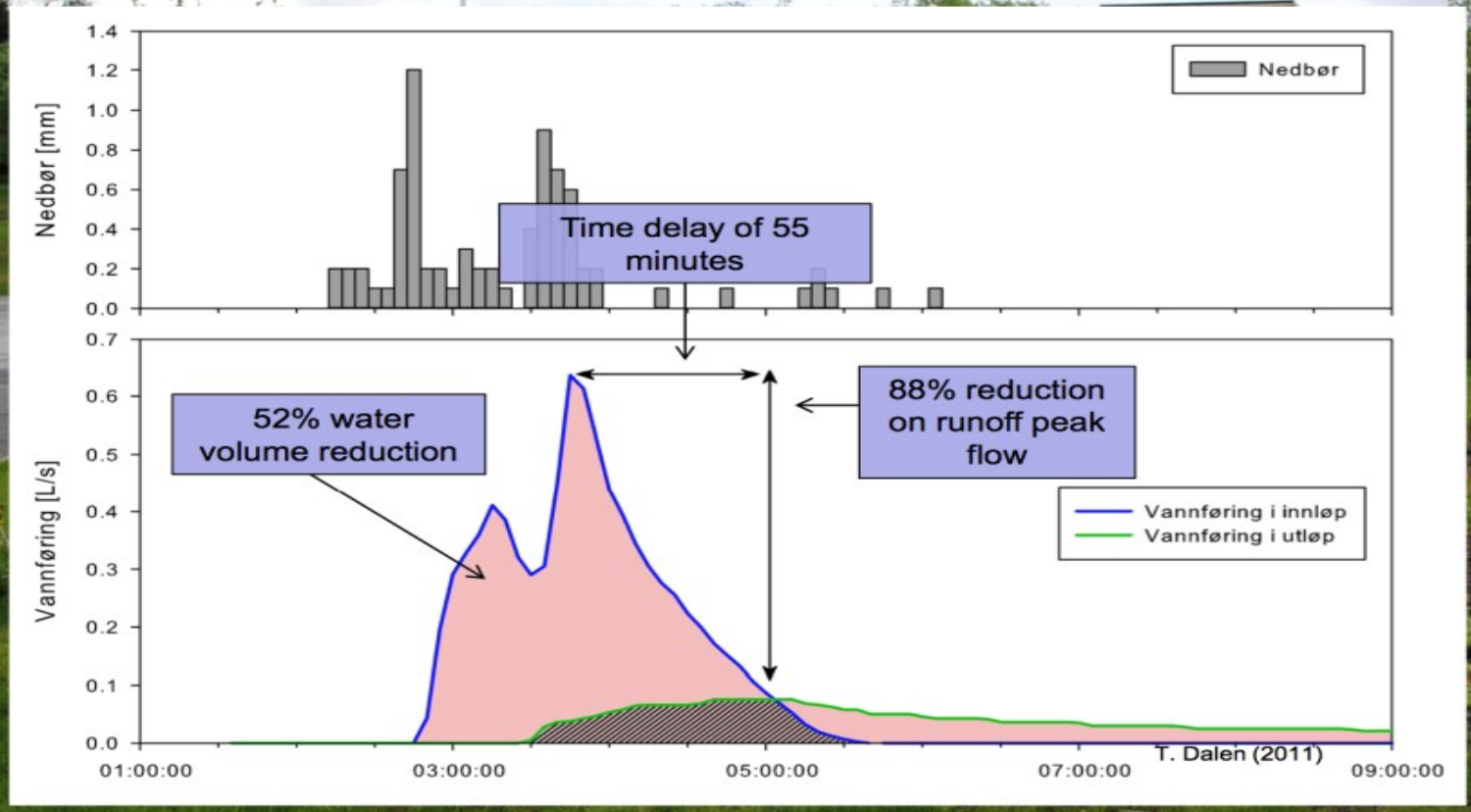
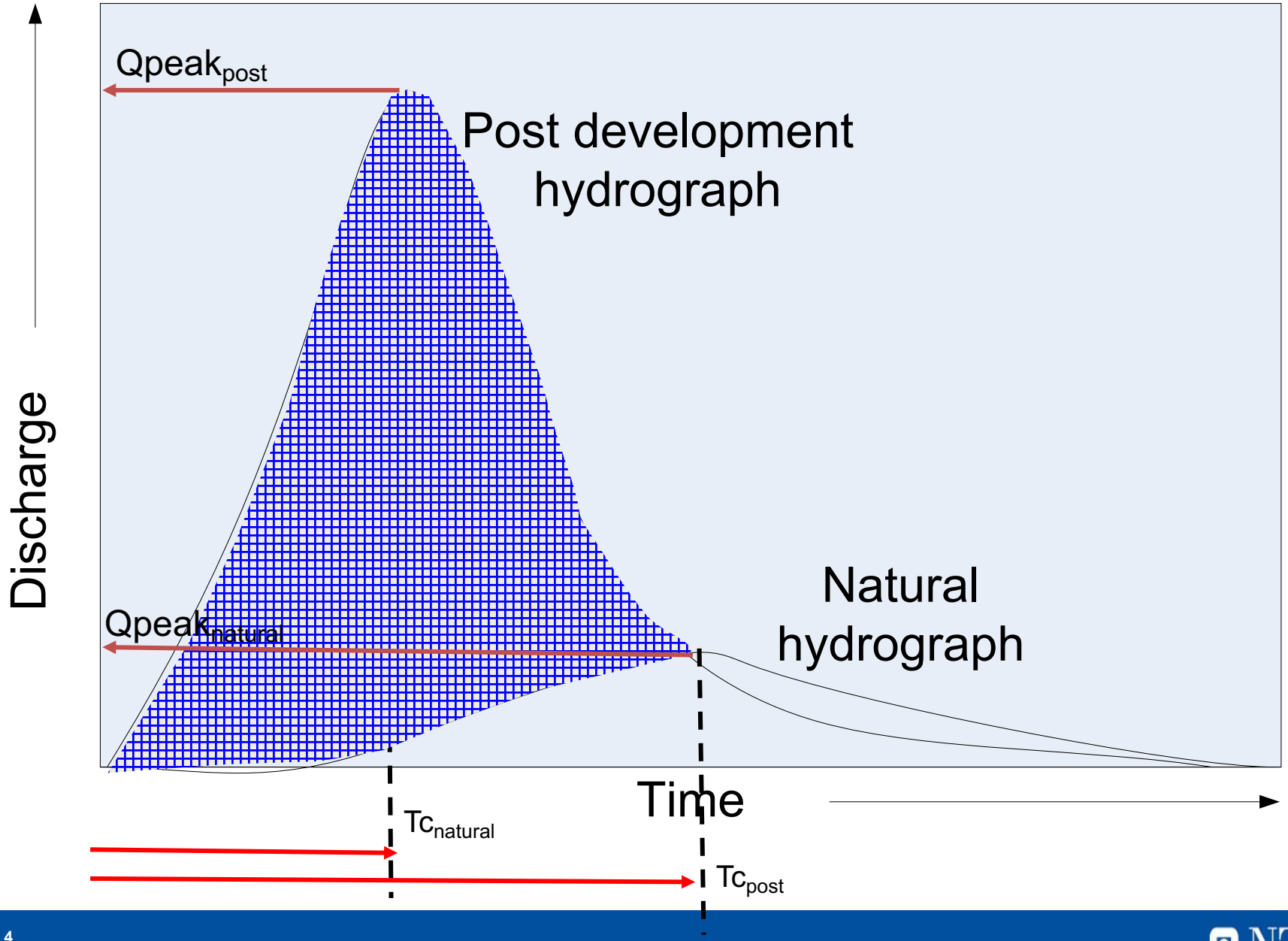
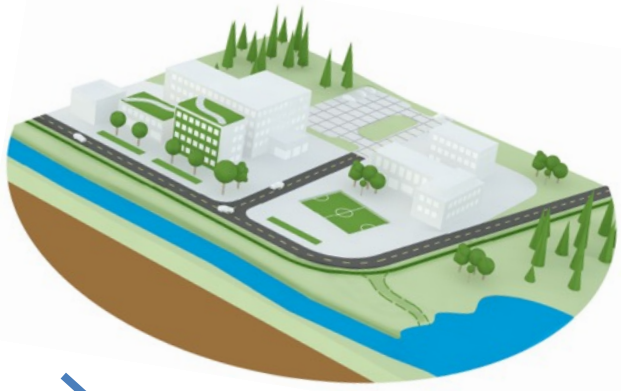
Example of Runoff Event: 9.2 mm (23 Juli 2011)




Qpeak$_{post}$
Post development hydrograph
Qpeak$_{natural}$
Natural hydrograph
Discharge
Time
Tc$_{natural}$
Tc$_{post}$

3 trinns-strategien



Infiltrasjon

Fordrøye

Trygge flomveier

Bioretention cell/ Rain garden

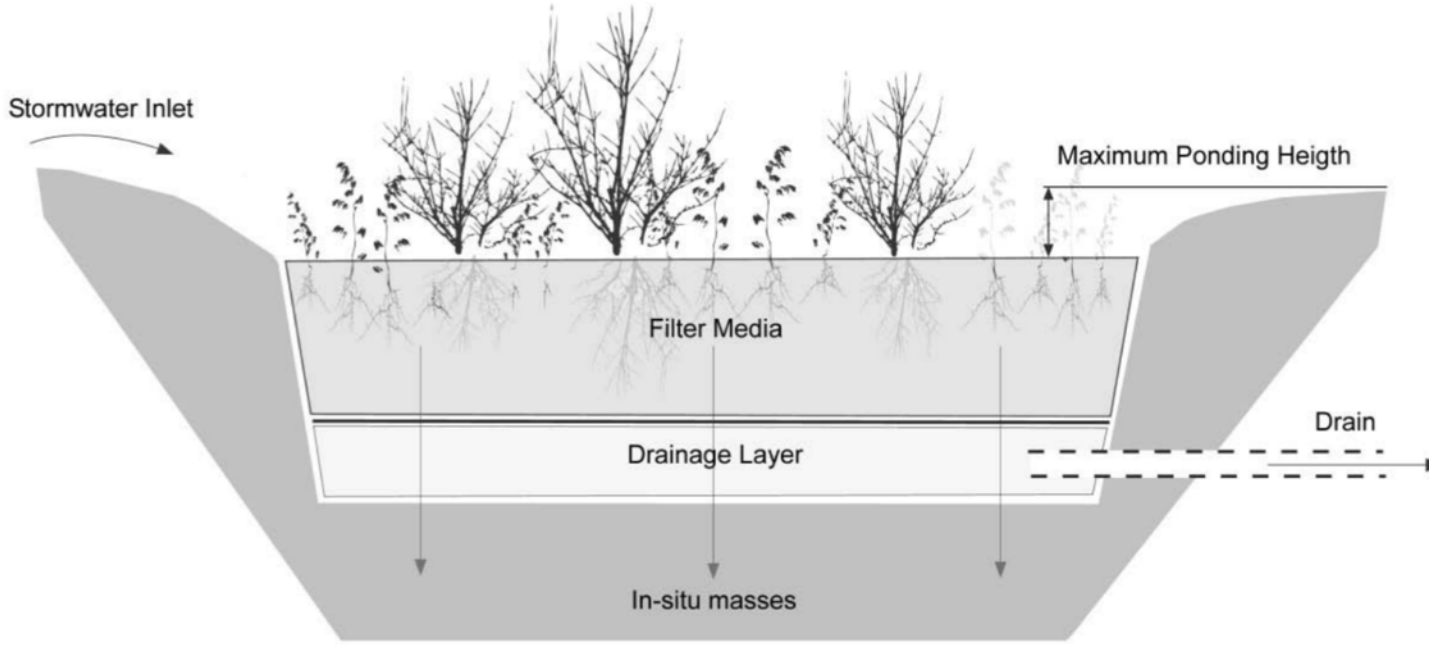


Illustration: B. C. Braskerud, K. H. Paus, A. Ekle, (2013) Anlegging av regnbed. En billedkavalkade over 4 anlagte regnbed. NVE Rapport 03/2013.

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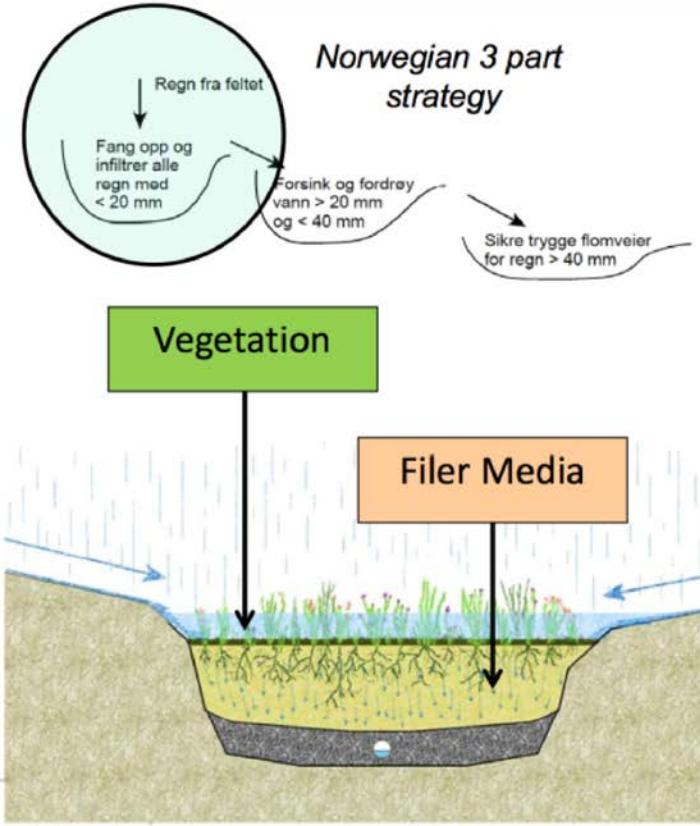
Rain garden



- Surface area (typical 20 – 80 m^2) **~ 5-10%** of the catchment area
- Vegetation layer with robust plants that can sustain both dry and wet conditions.
- Filter media a mixture of 50-60% **sand**, 20-30% **topsoil** and 10-20% **compost**.
- Decentralized action to manage the initial runoff ***("First Flush")***

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Kulturhistorisk regnbed

Bioretention cell/ Rain garden

Stevens Institute of Technology, New Jersey, US

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Bioretention planters

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Bioretention planters

Stevens Institute of Technology, New Jersey, US

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Nyanlagt regnbed

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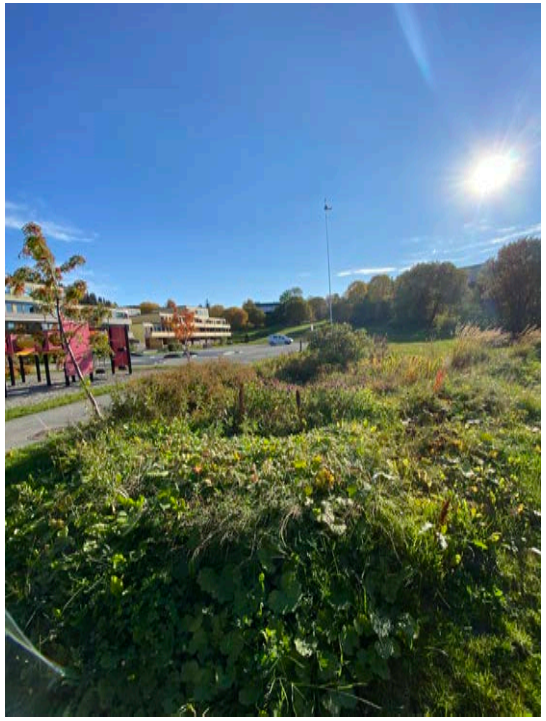
Regnbed på vinteren

Regnbed over flere år og sessonger

June 2014

May 2019



October 2020

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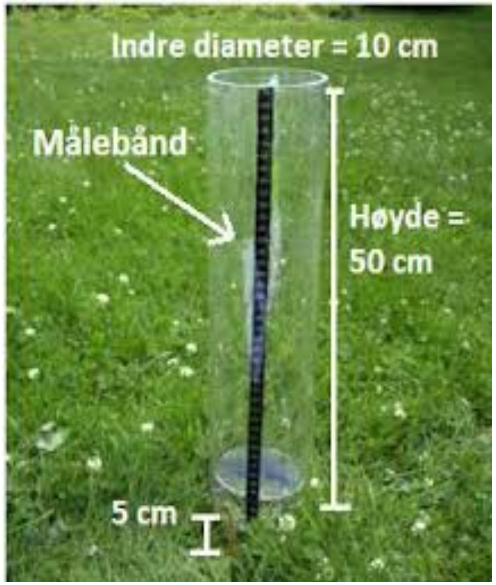
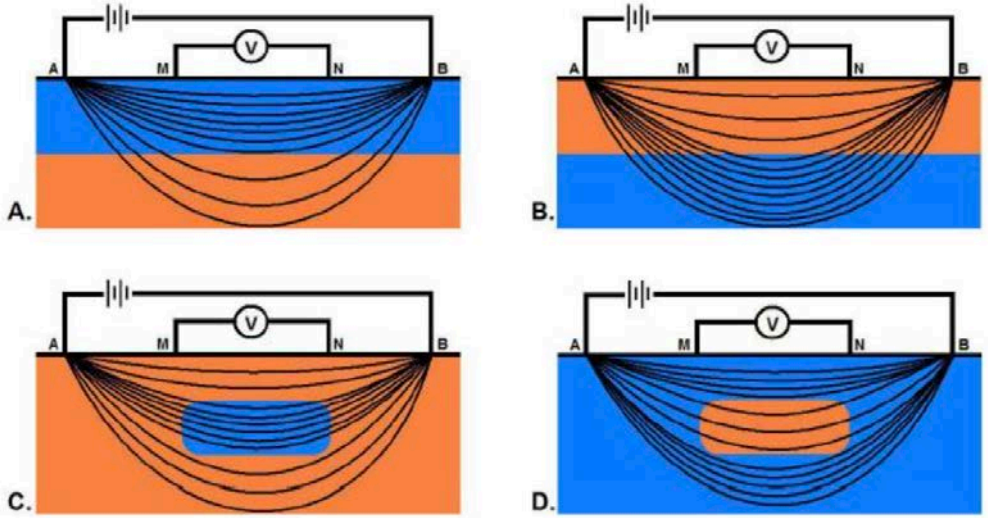
Infiltrasjonsmålinger





Photos: Elisabeth Solheim

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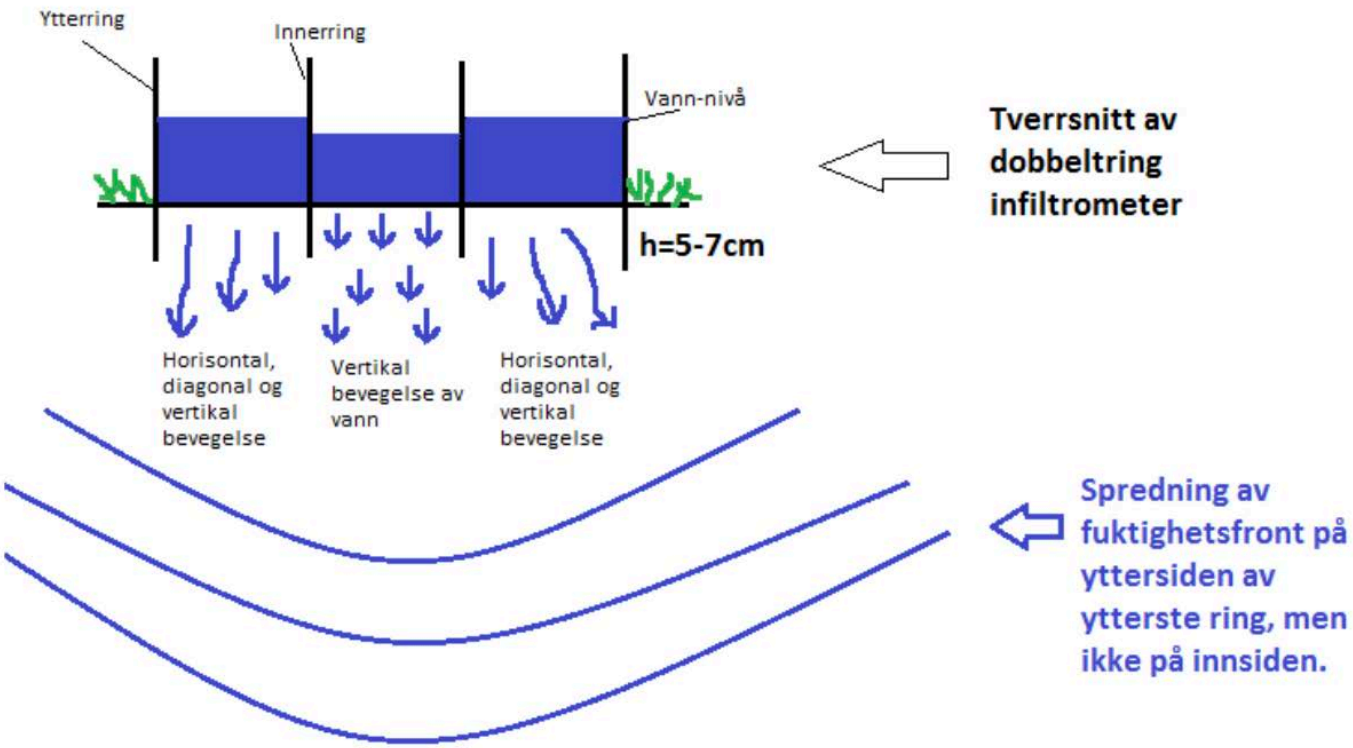

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Figure from Elisabeth Solheims master thesis: “Infiltrasjon for lokal overvannsdisponering (LOD) - Vurdering av metoder for å måle infiltrasjon på lokal tomt”

Infiltrasjonsmålinger

- Modified Phillip-Dunne (MPD)
- Saturated hydraulic conductivity (Ksat [cm/time])
- Measured change in water level => Ksat


T-1.4

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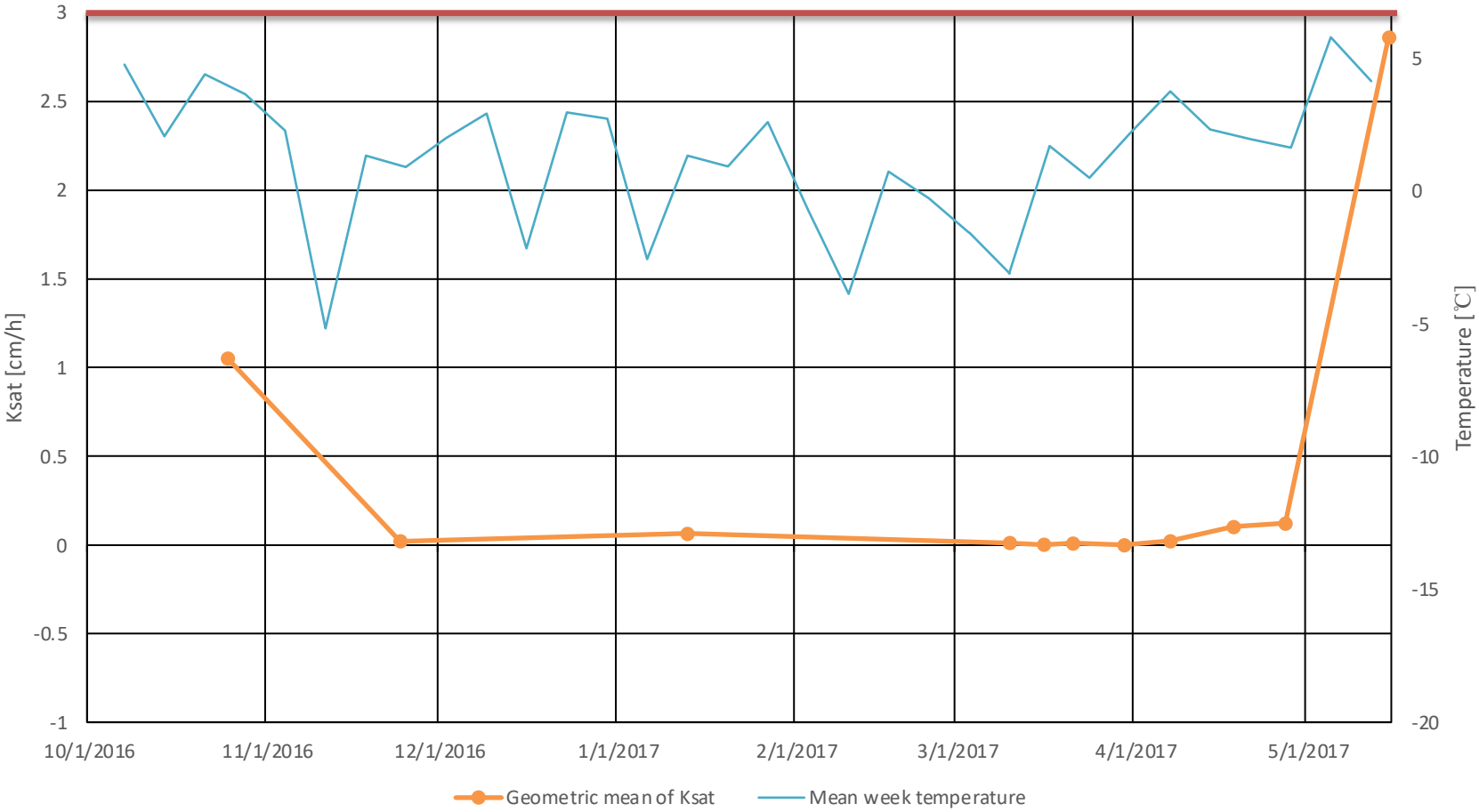
Sesongvariasjoner



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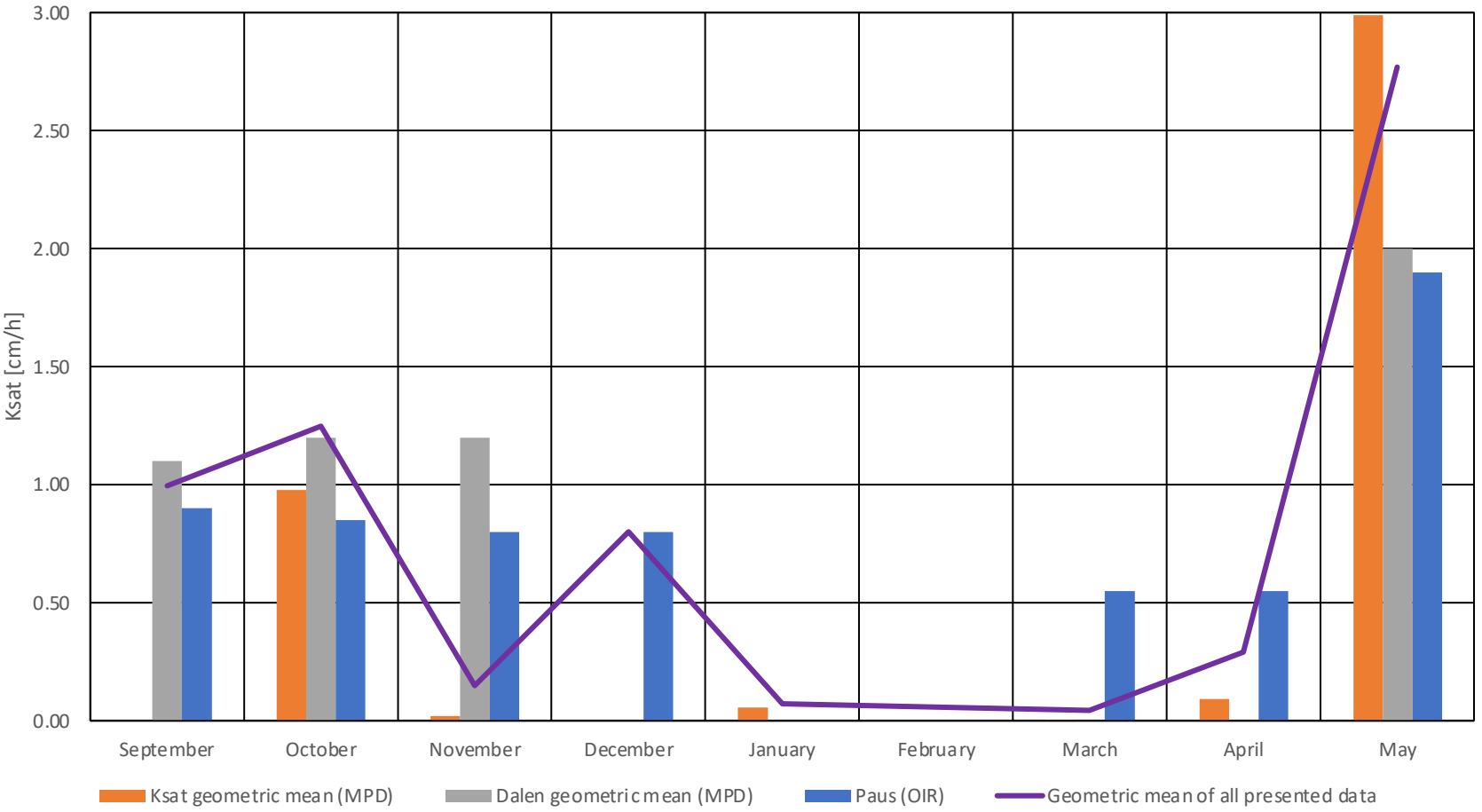

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Case: Campus NTNU

The Gløshaugen campus area in Trondheim

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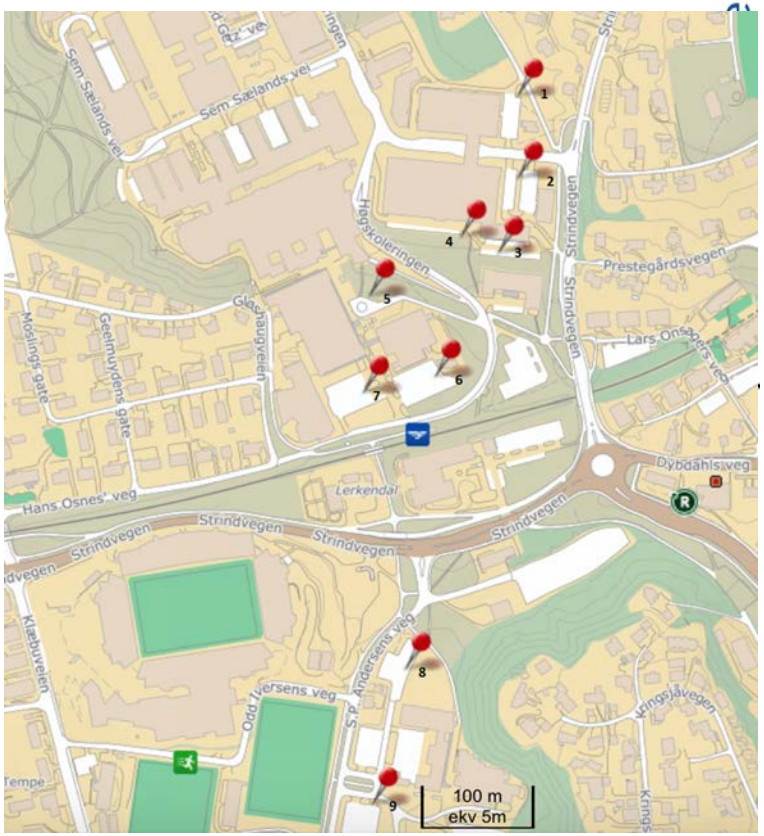
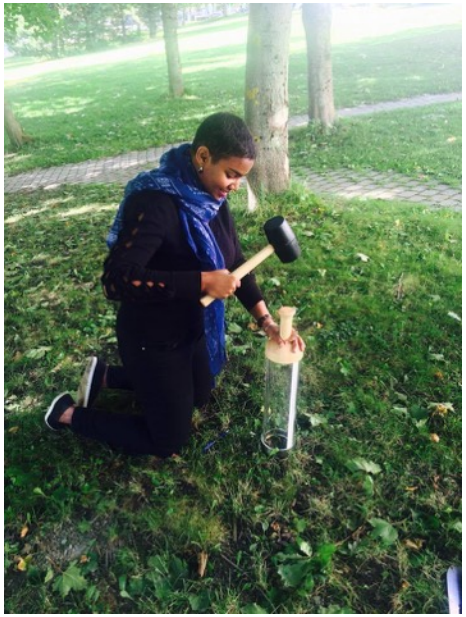
Infiltration measurements

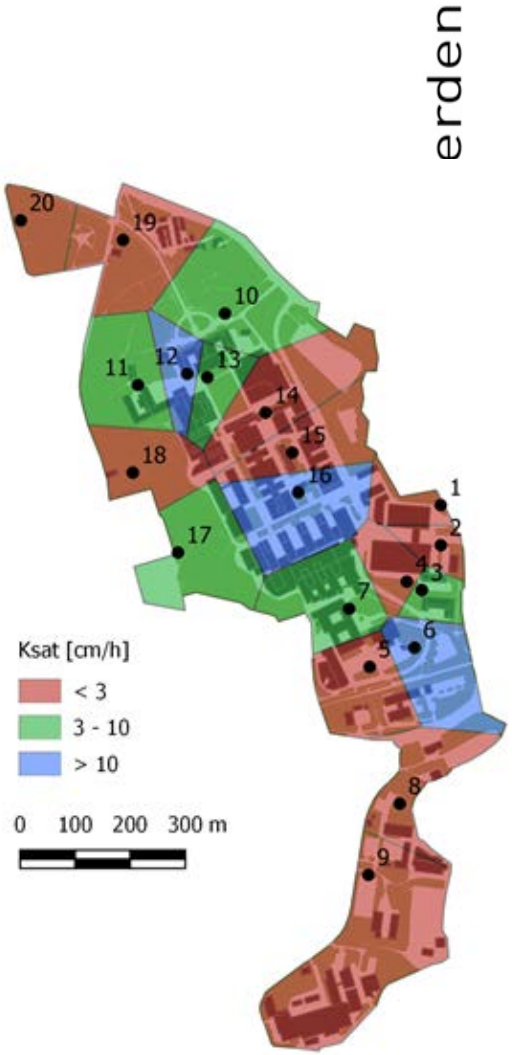
MPD measurements



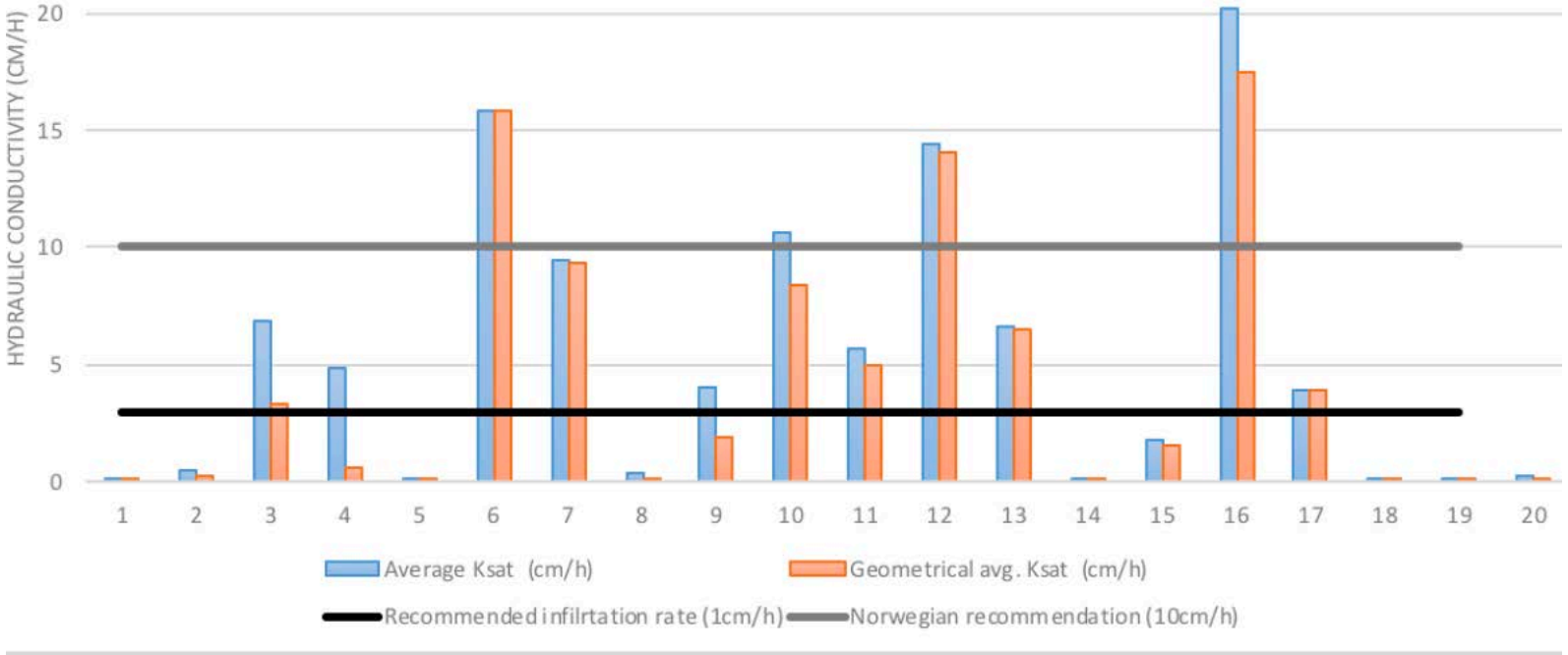
Field investigations:

- Infiltration potential (Ksat-verdier)
- Characterization of soil (sand, silt clay)





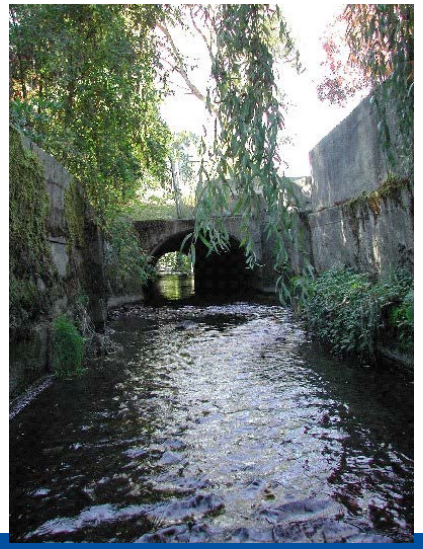
Infiltration potential



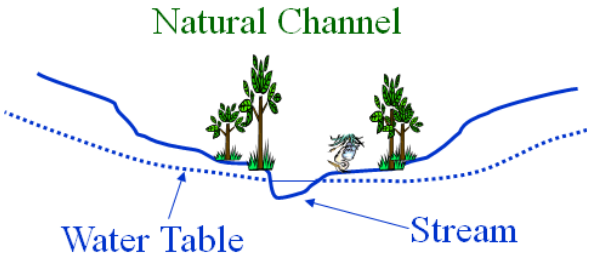
Distribution of saturated hydraulic conductivity (Ksat) over the 20 sampling sites. The simple average and the geometric mean are reported together with the typical international recommended rates of 3 cm/h, and the Norwegian of 10 cm/h.

Overvann – urbanisering og erosjon

- Volume and velocity: both important parameters
- Accelerated channel erosion in urban streams
- Changing the time
  of concentration
  and time to peak

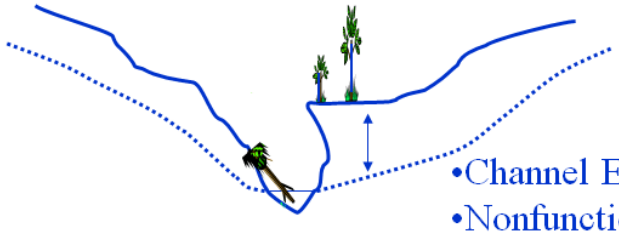


Urbaniserende bekker

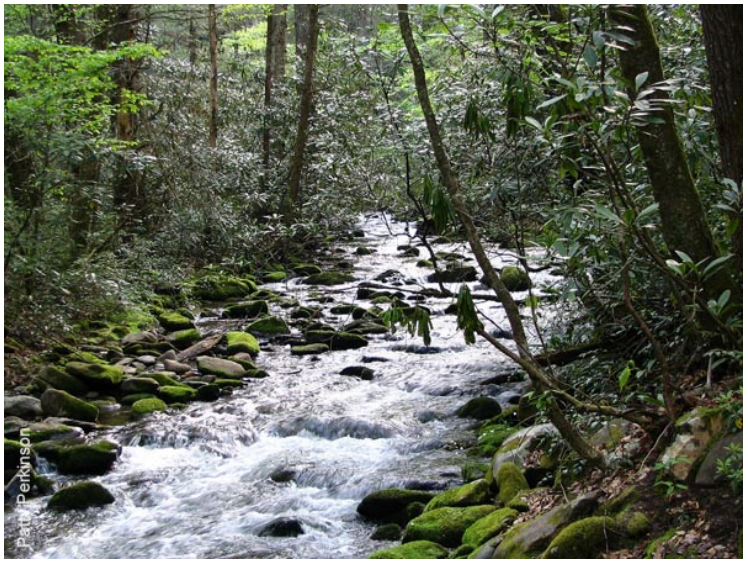


Channel with Incision
Due to Increased Runoff

- Urban stream syndrome:
  - High storm flows.
  - Incised channels.
  - Drier riparian zones with lower water tables.



- Channel Erosion
- Nonfunctional Floodplain
- Dry Riparian Soils



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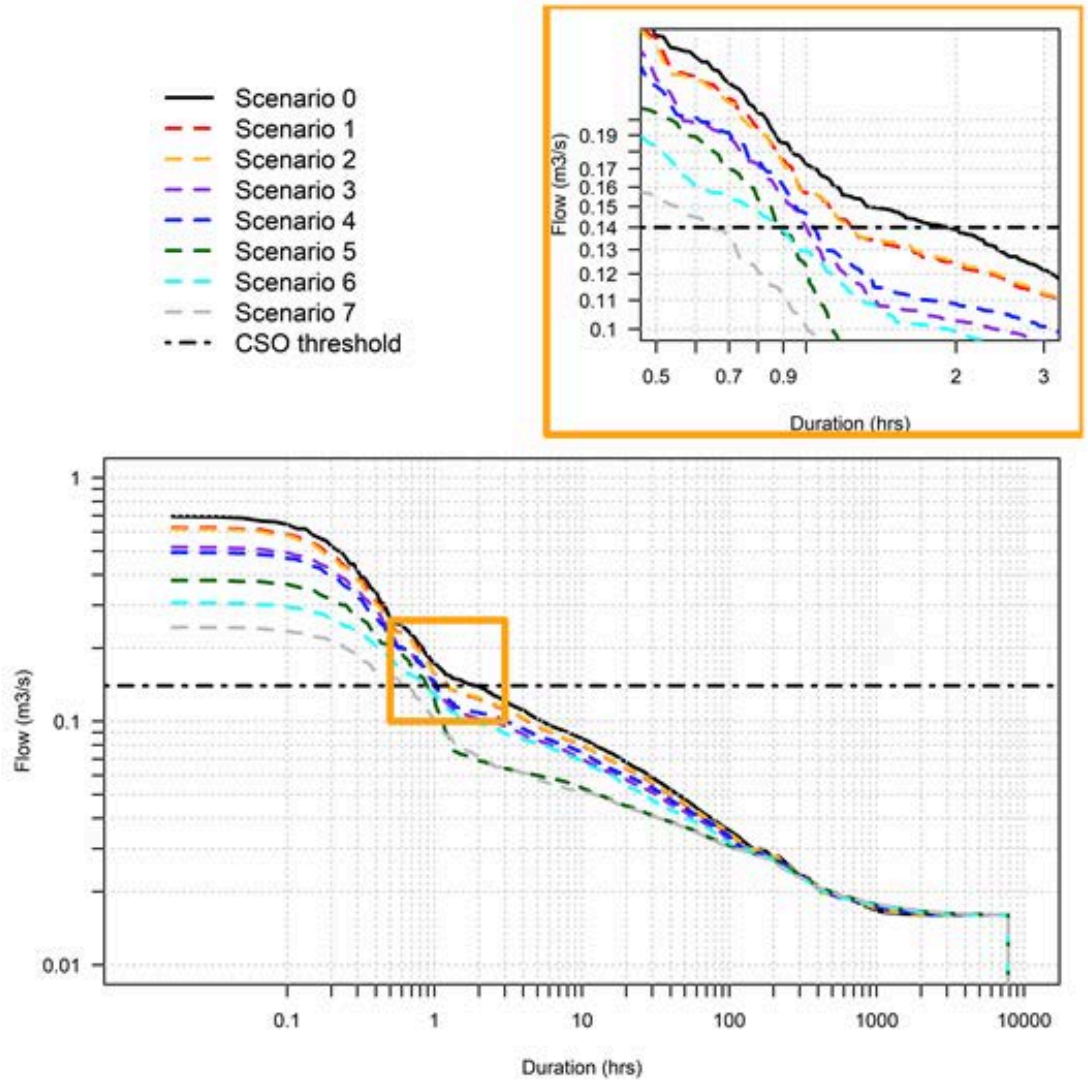
Evaluering av bruk



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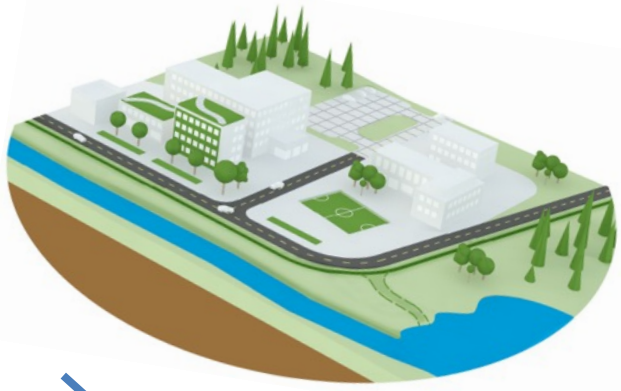
3 trinns-strategien



Infiltrasjon

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