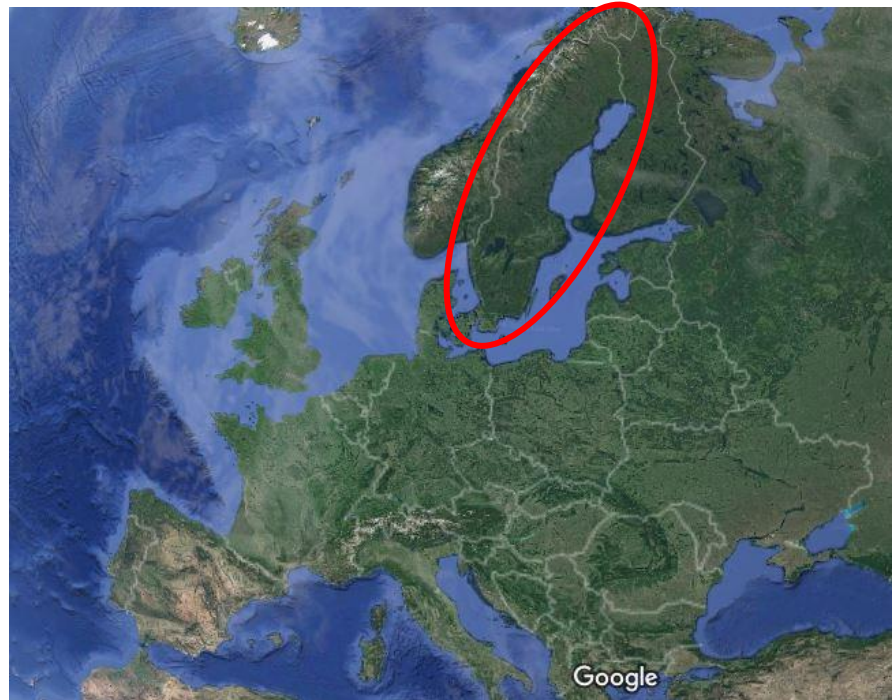


Bettina Matti
2018-11-08

Sweden's droughts 2016-2018 – Actions taken and lessons learned - Surface Water





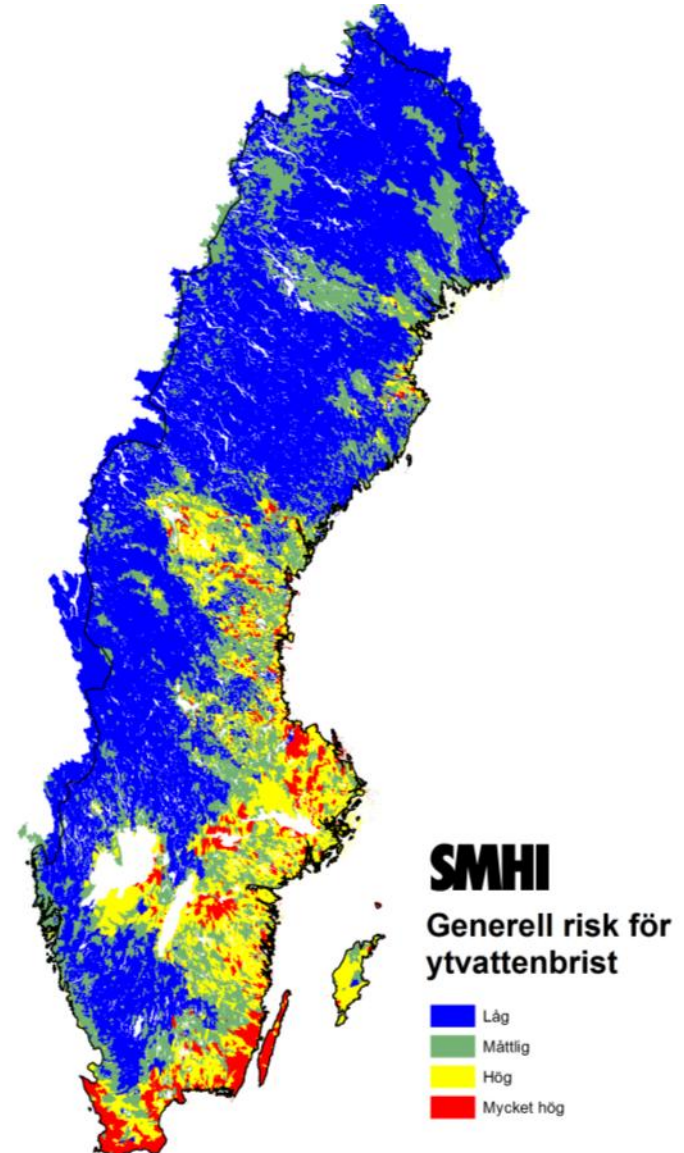
- Total area: 447,435 km² (8.97 % water)
- ~100,000 lakes > 1 ha
- 10.1 million inhabitants
- 21 counties, 290 communes

General risk for droughts in surface water bodies

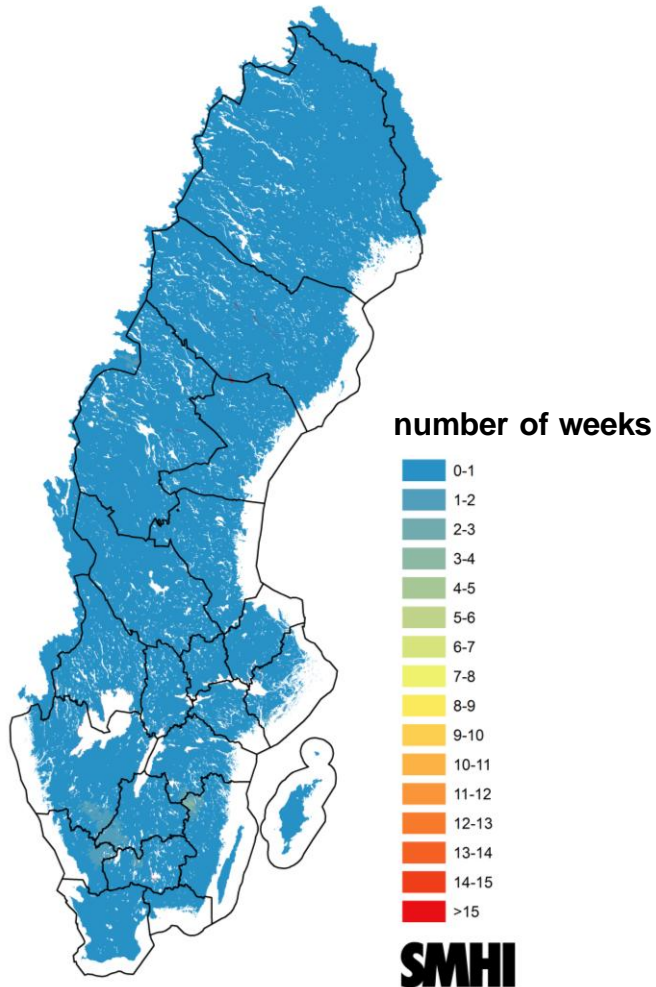
- ✓ ...in generally dry areas (climate)
- ✓ ...low buffer capacity
- ✓ ...low fraction of water habitats (incl. wetlands)

Combining the lowest 25 % of each of the above, the map returns approximately 5.5 % of Sweden that are areas with a very high risk for droughts

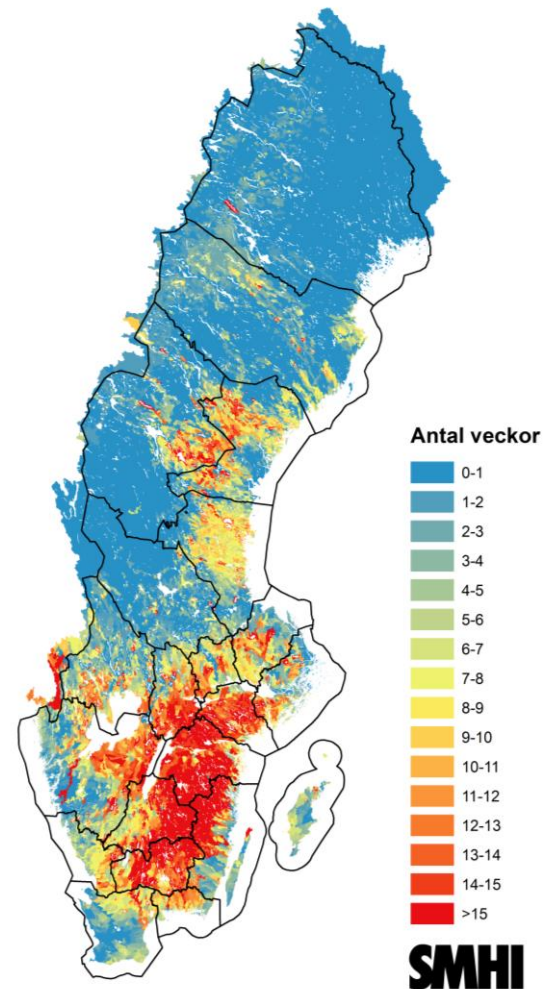
Note: Preliminary map!



Soil moisture



Surface water



The (hydrological) year 2016

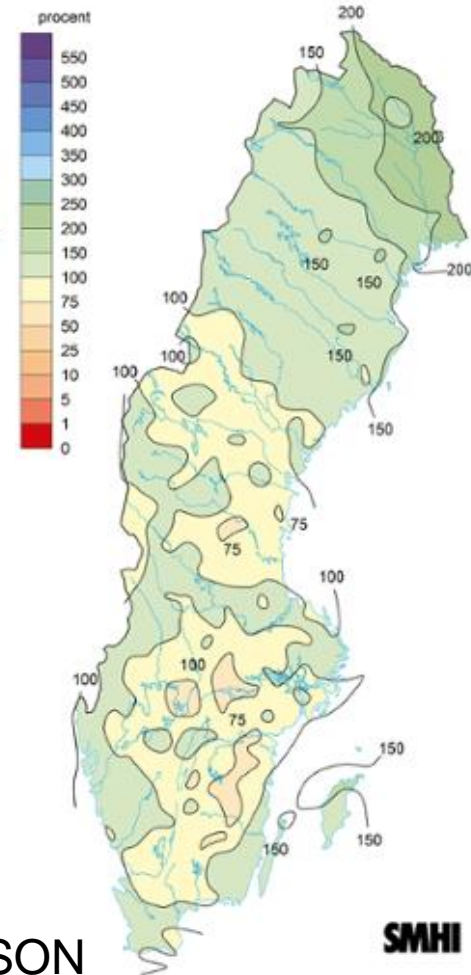
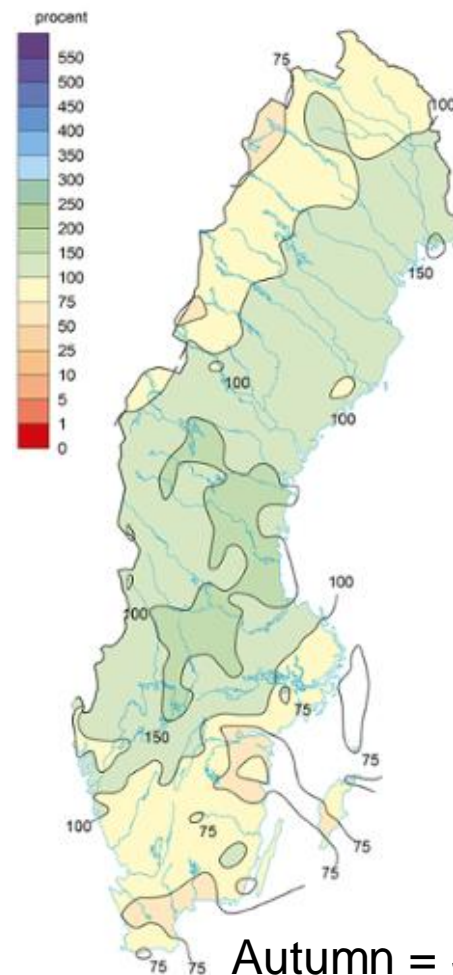
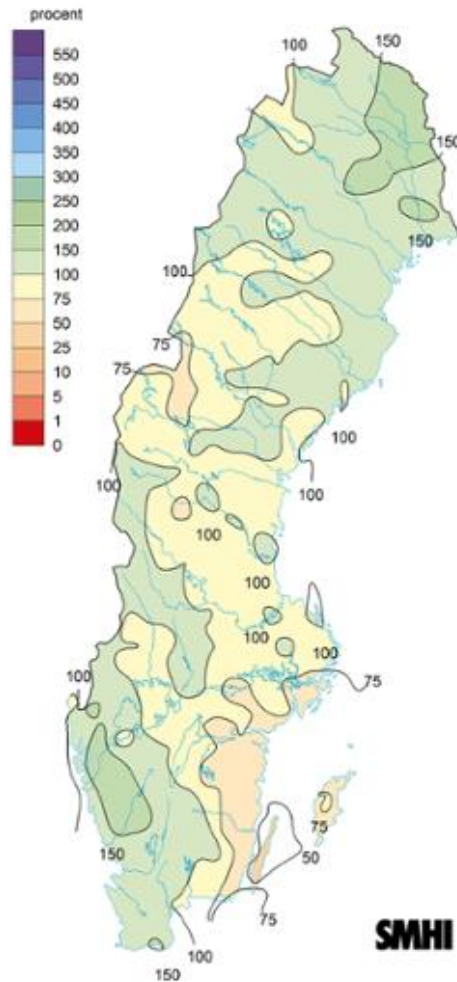
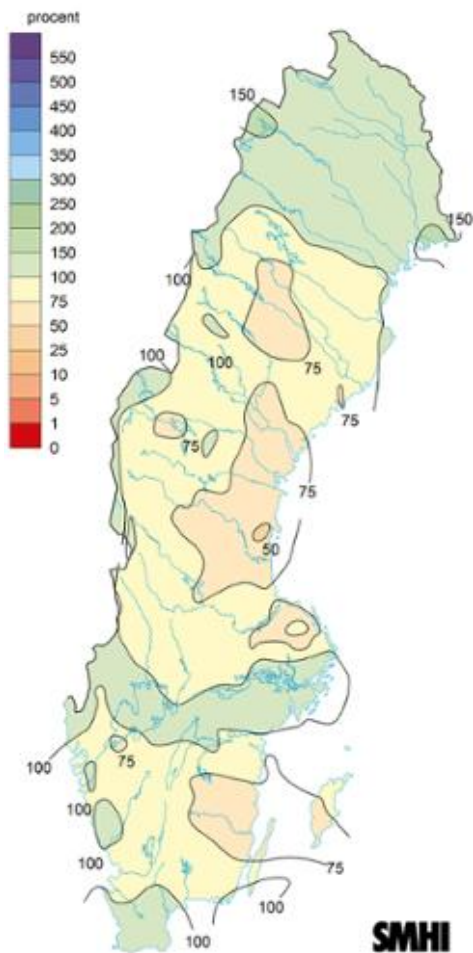
SMHI

Autumn 2015

Winter 2015/2016

Spring 2016

Summer 2016



Autumn = SON
Winter = DJF
Spring = MAM
Summer = JJA

Precipitation % of normal (1961-1990)

The (hydrological) year 2017

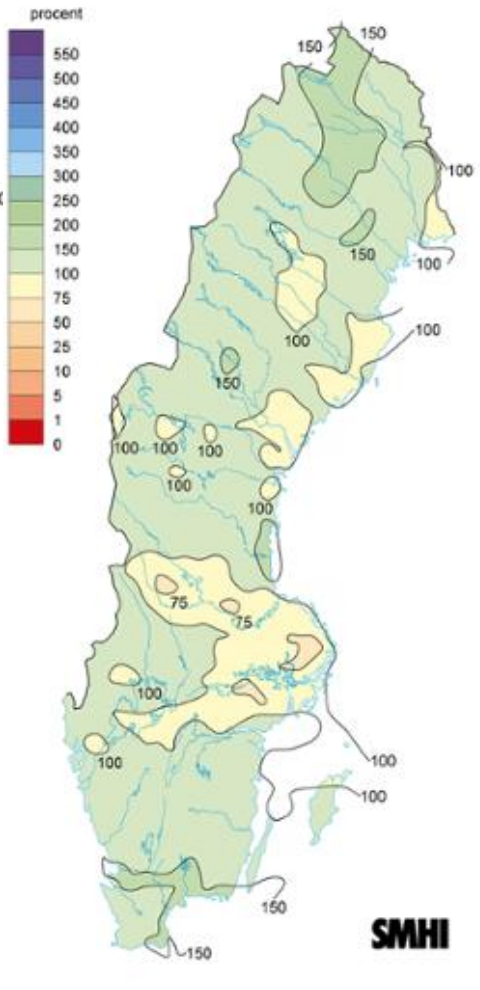
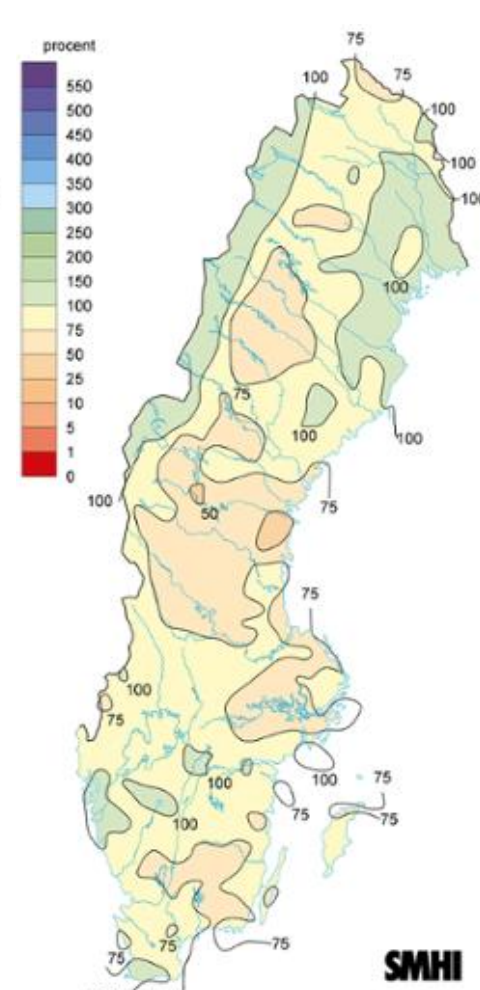
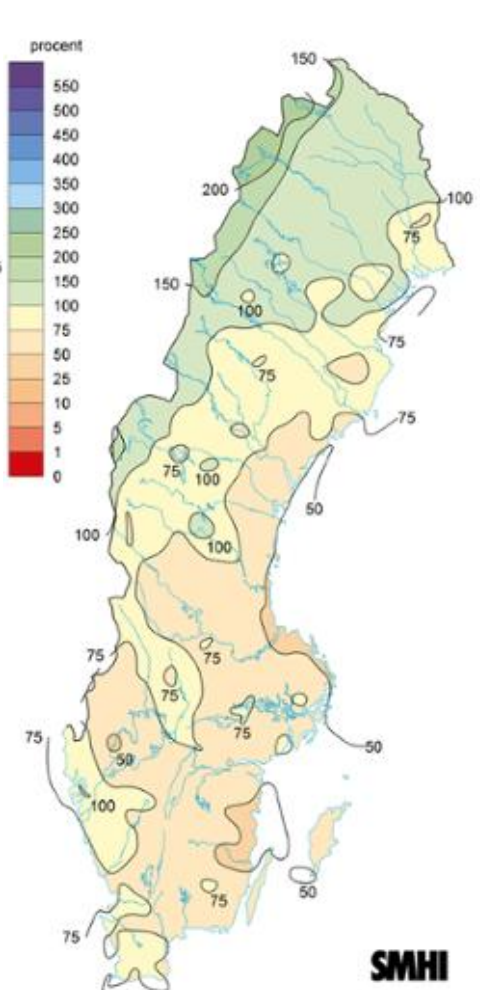
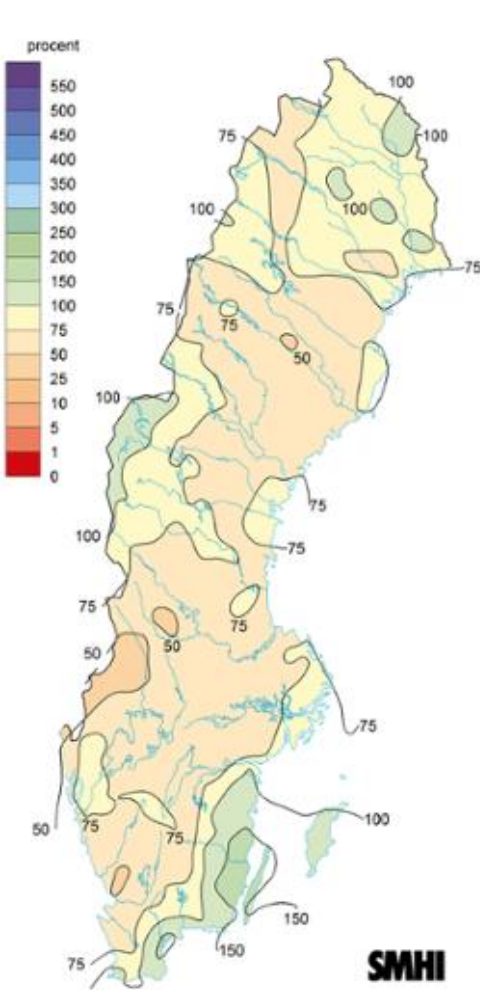
SMHI

Autumn 2016

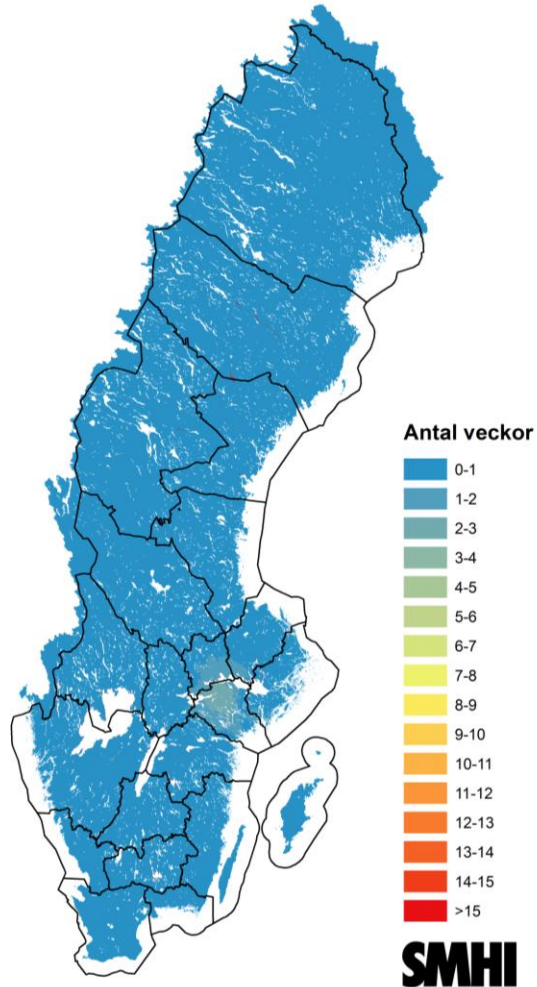
Winter 2016/2017

Spring 2017

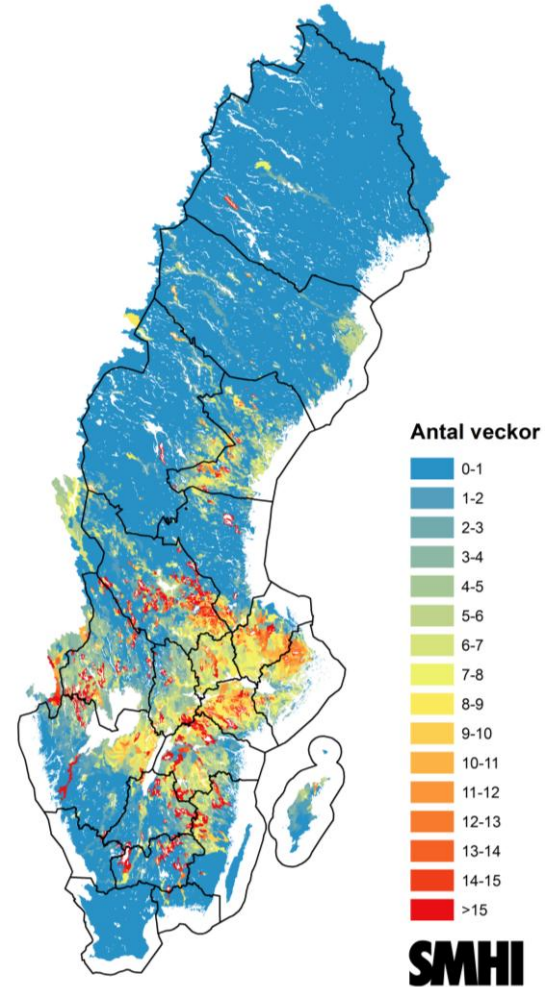
Summer 2017



Soil moisture



Surface water



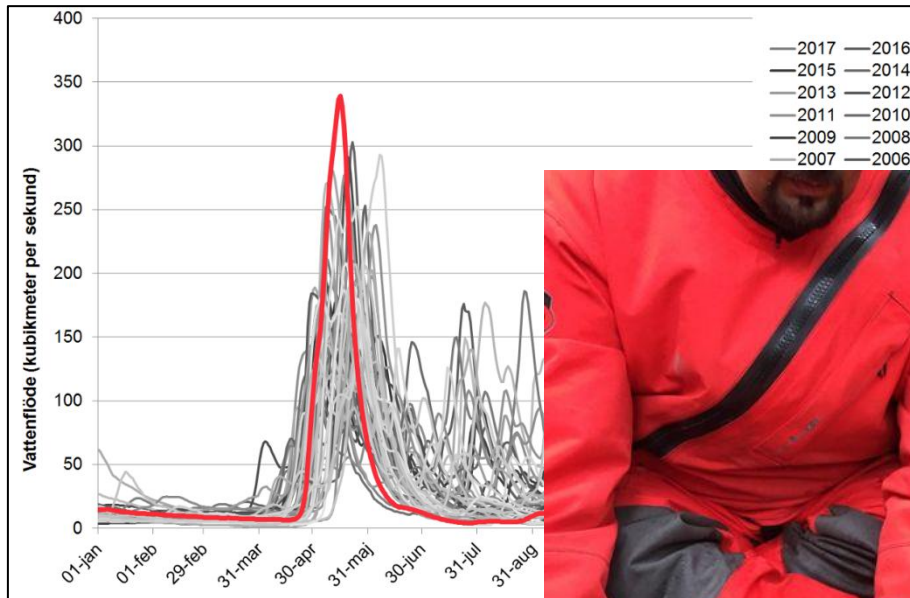
"Risk för vattenbrist"

- Risk for water shortage
- Start on smhi.se in June 2017
- Collaboration between SGU and SMHI
- Updated once a week
- Risk issued for rivers (medium-sized and large catchments as well as sensitive rivers), large lakes, groundwater aquifers
- Risks per varning district
- Distribution via smhi.se, email
- Help for county governments and the public

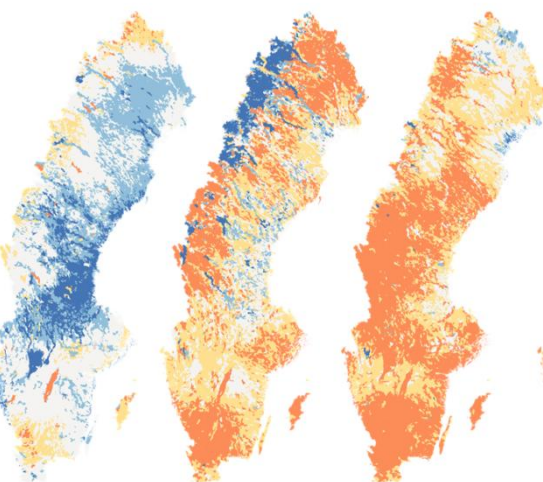
<https://www.smhi.se/vadret/vadret-i-sverige/risk-for-vattenbrist>

The screenshot shows the SMHI website page for 'Risk för vattenbrist'. At the top, there is a navigation bar with links for 'SMHI', 'Vadret', 'Klimat', 'Data', 'Professionella tjänster', 'Kunskapsbanken', and 'Forskning'. Below the navigation bar, the main heading is 'Risk för vattenbrist', followed by a sub-heading: 'Information om risk för vattenbrist tas fram i samverkan mellan SGU och SMHI. Kartor och information om lägföden från SMHI uppdateras varje månad. Kartor och information om grundvattnet från SGU uppdateras måndagar efter den 25:e.' The page is divided into several sections: 'Nålgösbild (15 juni)' which provides a general overview of the risk; 'DEFINITION AV VATTENBRIST' which explains the criteria for water shortage; 'RISK FÖR VATTENBRIST I FÖLJANDE OMRÅDEN' which lists various regions and catchments at risk, including 'GRUNDVATTEN (SGU)', 'VATTENDRAG OCH SJÖAR (SMHI)', and 'NEDERBÖRD OCH GRUNDVATTEN'. A map of Sweden is shown on the right side of the page, with different colors indicating the risk levels. At the bottom, there are two more maps: 'NEDERBÖRDSVÄRDE FÖR 2016' and 'NEDERBÖRDSVÄRDE HITILLS UNDER 2017', which show precipitation levels across Sweden. The page also includes social media links for Facebook, Twitter, LinkedIn, and YouTube, and a 'Dela sidan' button.

Then 2018 came...



2018-04-30 2018-05-31 2018-06-30



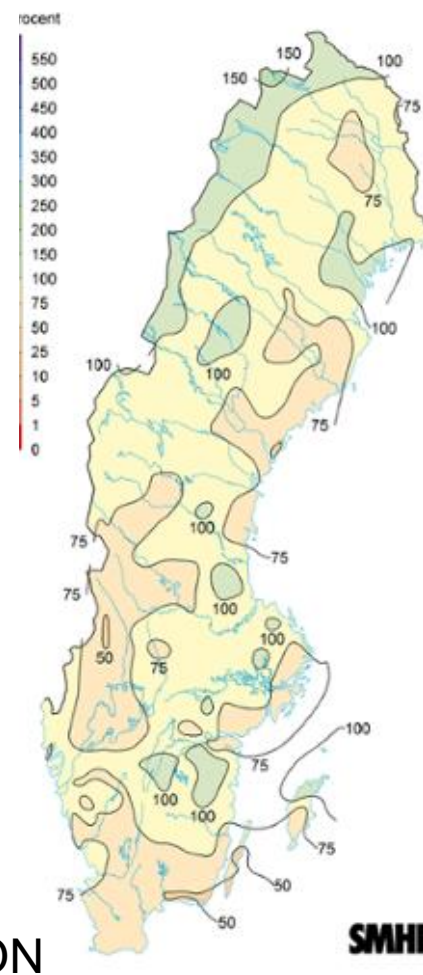
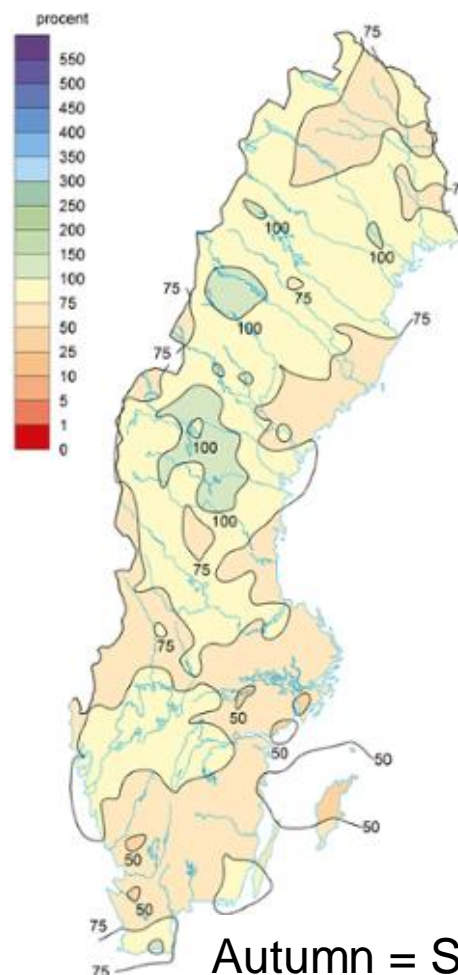
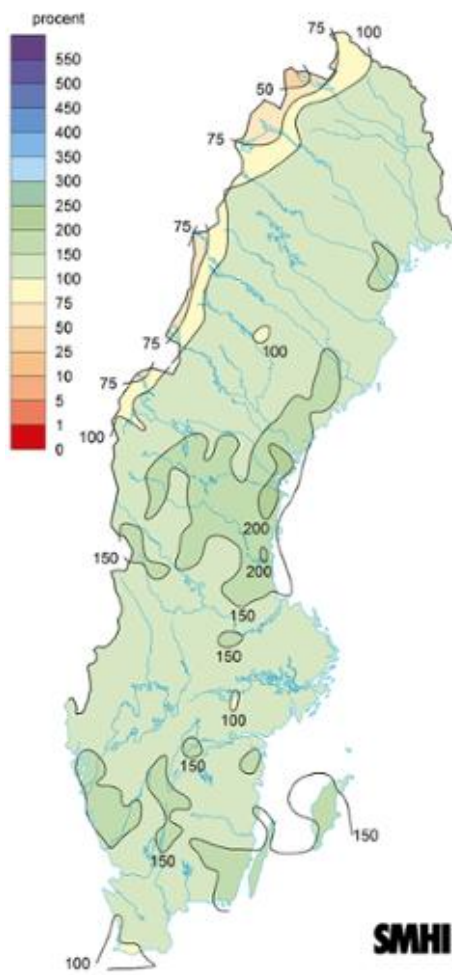
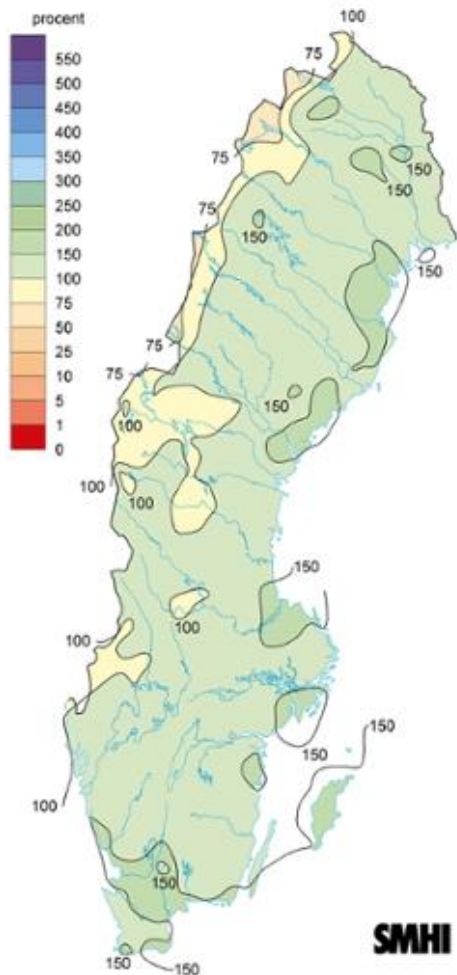
Then 2018 came...

Autumn 2017

Winter 2017/2018

Spring 2018

Summer 2018



Autumn = SON
Winter = DJF
Spring = MAM
Summer = JJA

Precipitation % of normal (1961-1990)

Then 2018 came...

Precipitation % of normal (1961-1990)

May

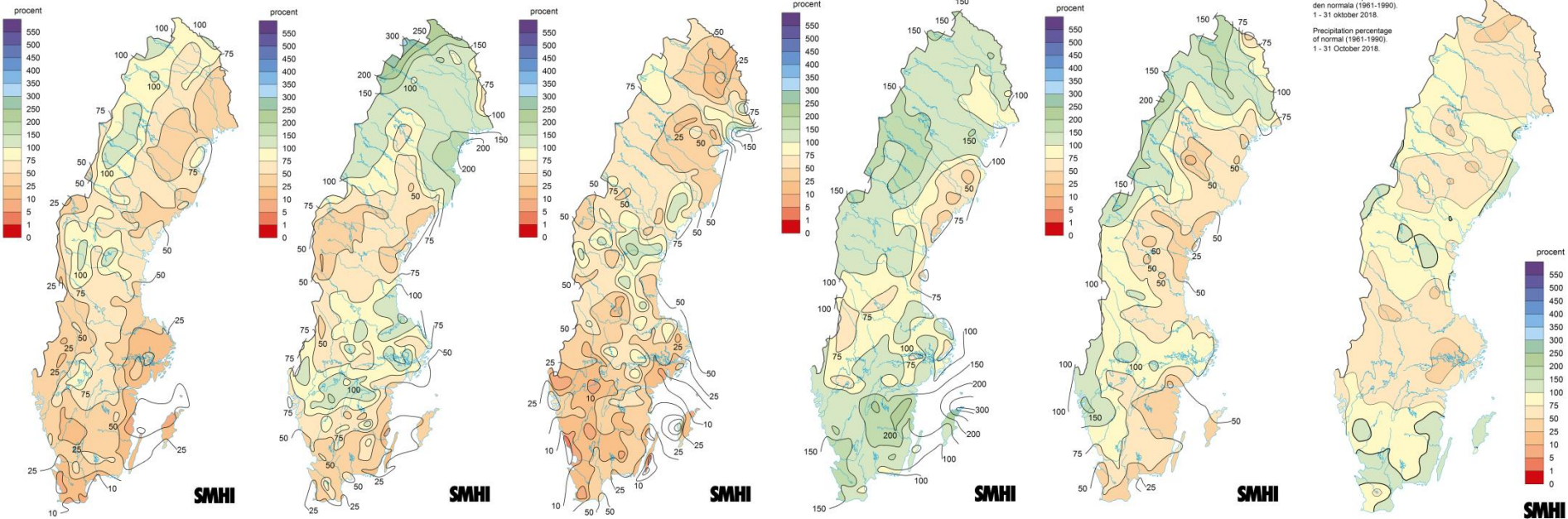
June

July

August

September

October

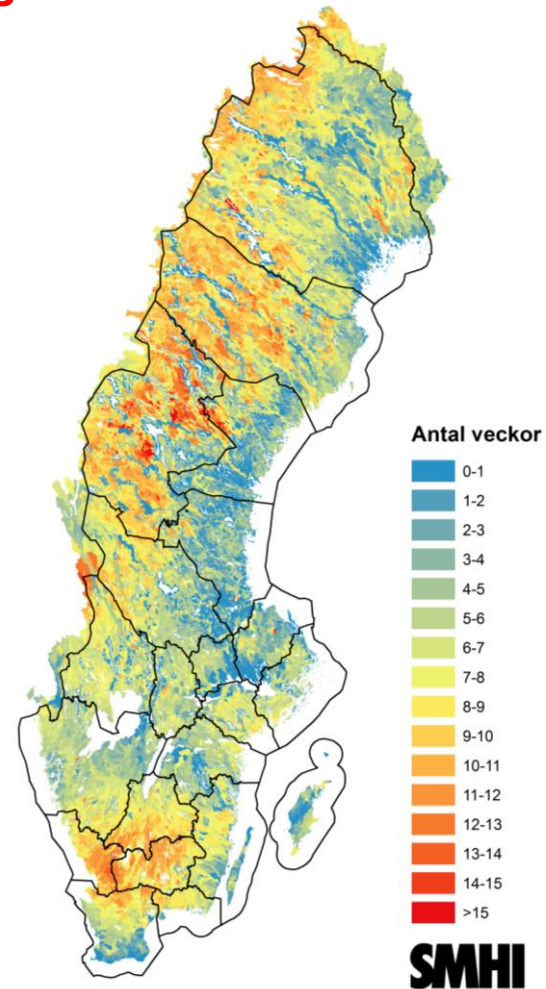
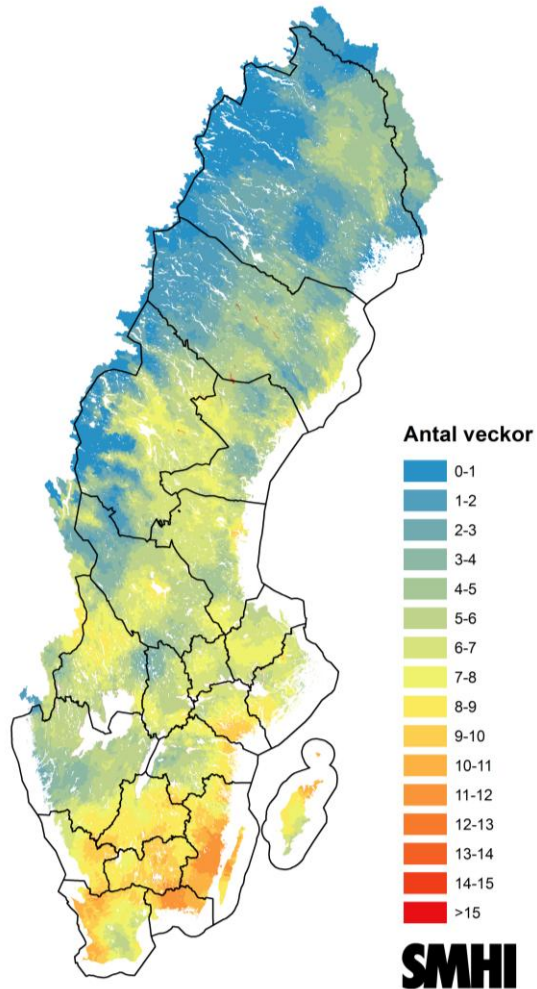


In combination with high temperatures (> 30 degrees C)

Soil moisture

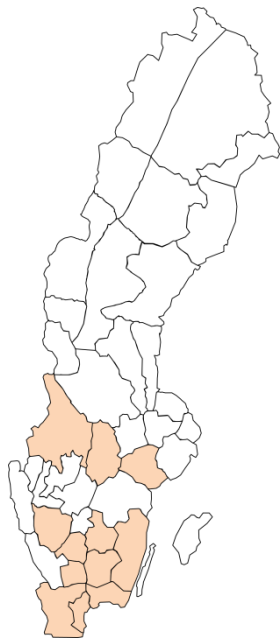
Surface water

Situation until 20. August 2018

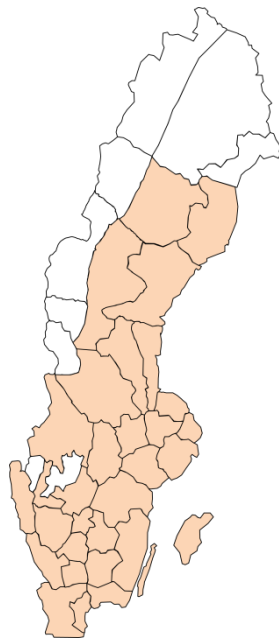


Risk for water shortage 2018

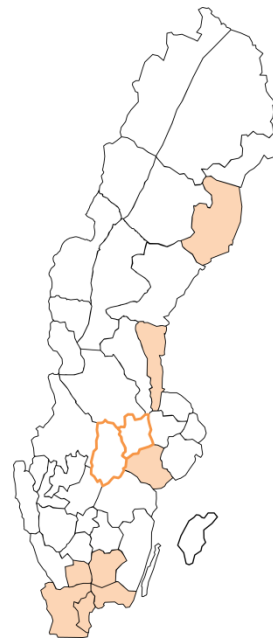
- First risk in week 27 (2 July) until ???
- Max in week 29 (19 counties) and 30 (20 counties) with risks **(16-29 July)**
- Counties with risks for period week 27-44 (2 July until now): Blekinge, Kronoberg, Skåne, Södermanland (4 counties)



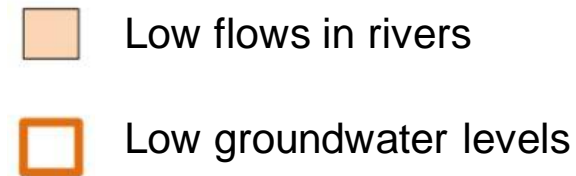
week 27



week 30

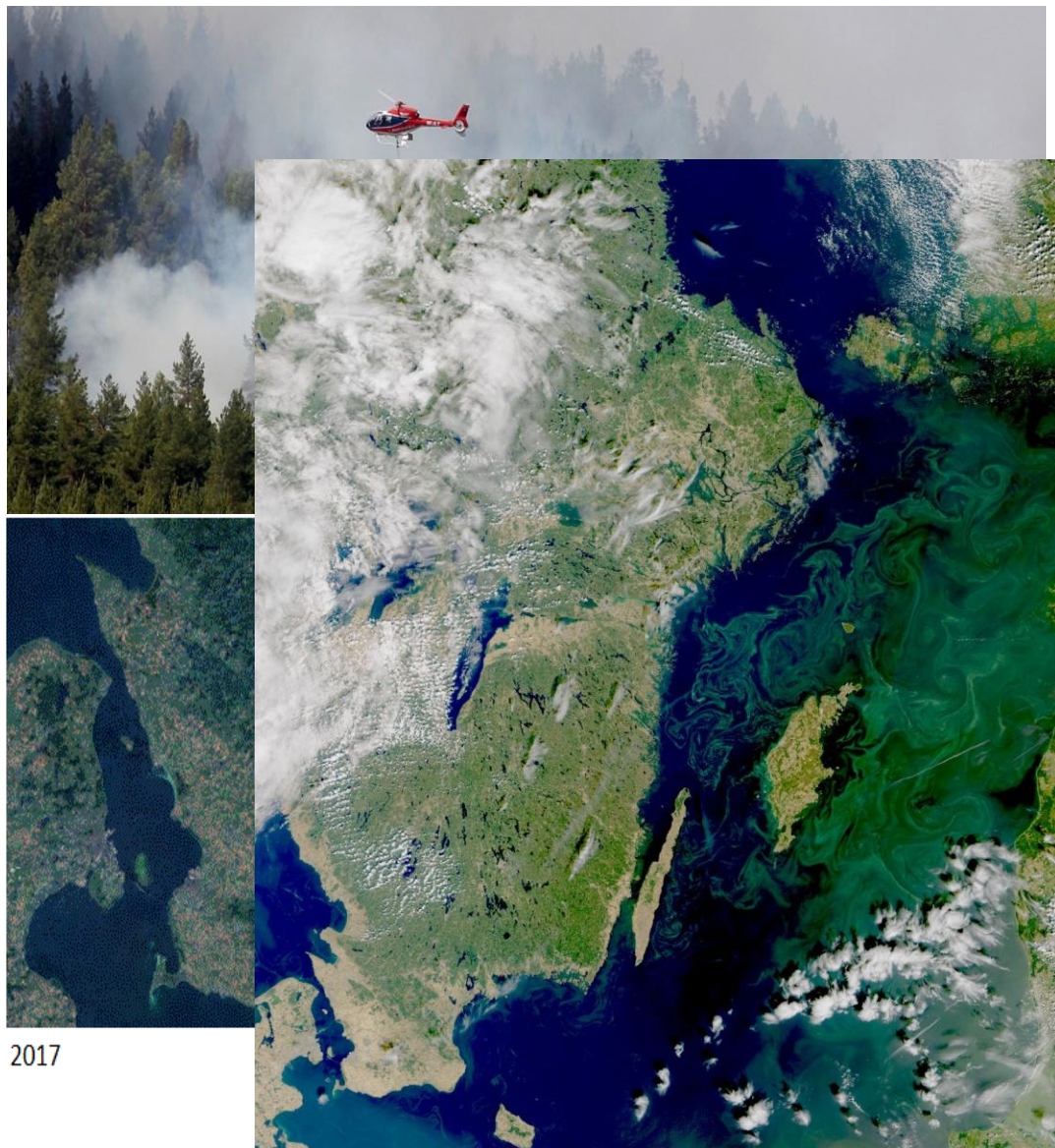


week 45



Consequences in 2018

- Forest fires
- Low water levels (both surface and groundwater)
- Drinking water scarcity
- High water temperatures
- Water quality issues
- Decreased productivity for industries (paper factories, nuclear power plants)
- Very little fish in rivers
- High electricity prices due to low hydropower production rates
- Large harvest losses
- Emergency slaughters (no food or water for animals)
- ...



2017

A lot has been done – and yet a lot can (and has to) still be improved!

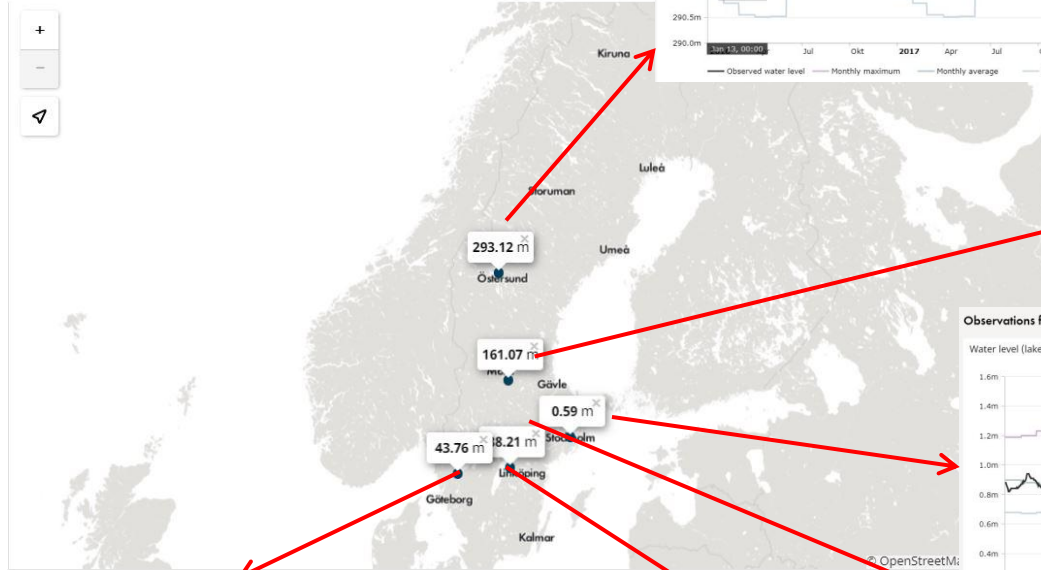
- Towards consequence-based warnings
- More coordination between authorities, stakeholders, etc.
- Raise awareness for droughts

Thank you!

6 large lakes 2016 – 2018

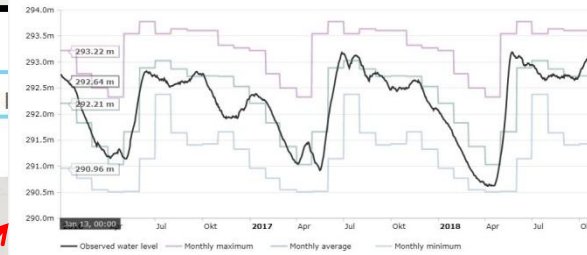
Latest observations

Search



Observations from recently

Water level (lake)

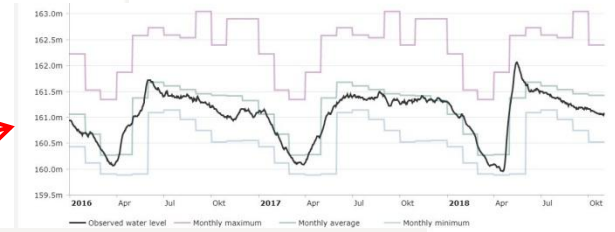


Storsjön

<https://www.smhi.se/en/weather/sweden-weather/observations#ws=wpt-a.proxy=wpt-a.tab=vatten.param=waterlevel>

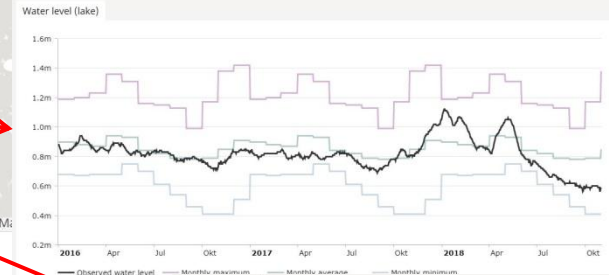
Observations from recently

Siljan



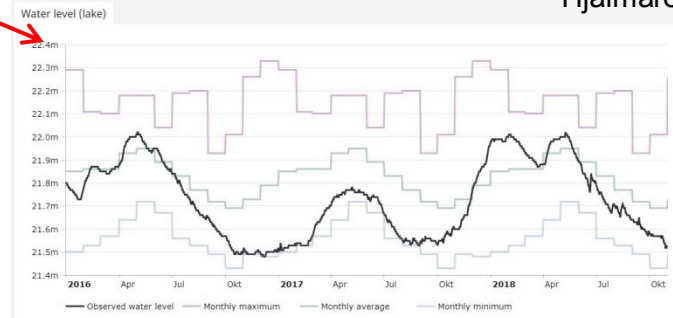
Observations from recently

Mälaren



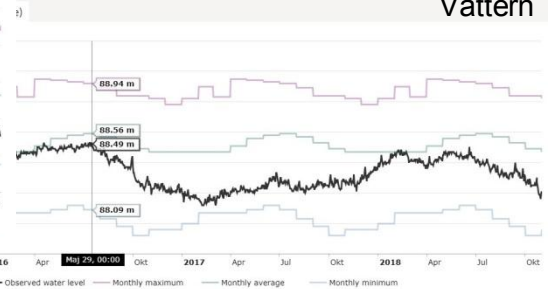
Observations from recently

Hjälmaren



Observations from recently

Vättern



Observations from recently

Vänern

