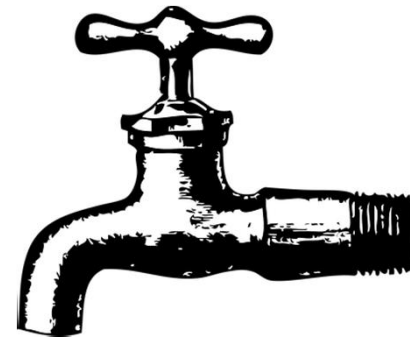


Screening of hazardous substances in urban groundwater (2016-2017)

Johan Carlström, by Jenny McCarthy

2019-05-23

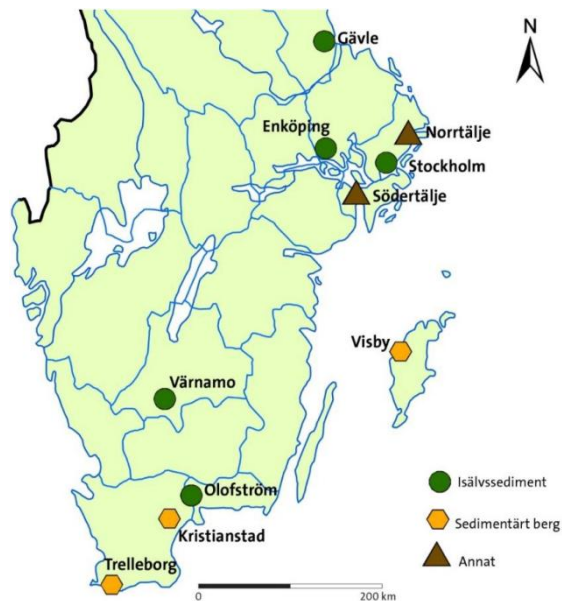


Parameters

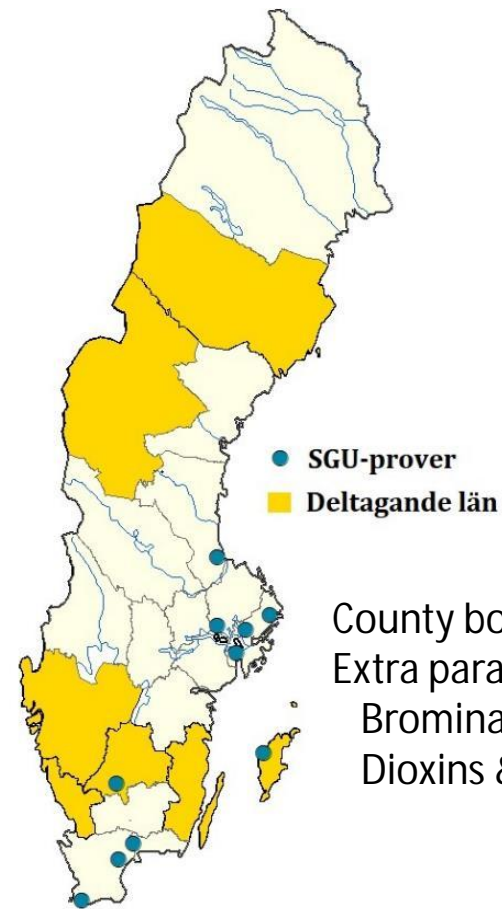
- Pesticides
 - PFAS substances
 - Halogenated aliphates + BTEX (benzene, toluene, ethylbenzene and xylenes)
 - Polycyclic aromatic hydrocarbons (PAHs)
 - Phenolics
 - Phthalates
 - Organotin compounds (tjennorganiska ämnen)
 - Pharmaceuticals
 - Dioxins, dioxin-like PCBs
 - Brominated flame retardants
 - Chemical elements (grundämnen)
 - Basic parameters (basparametrar) (alk, ammonium, fluoride, phosphate, nitrate etc)
- $\Sigma \sim 250$ parameters

Monitoring sites

Public water supply wells in urban areas

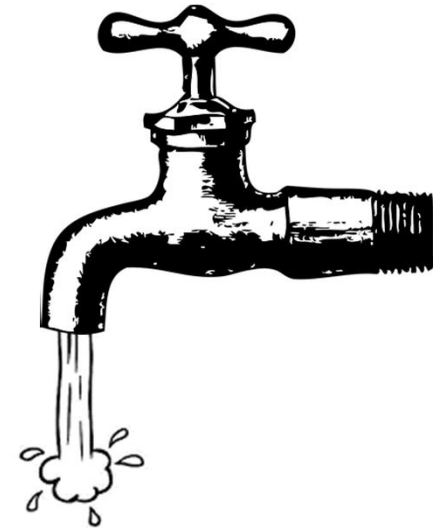
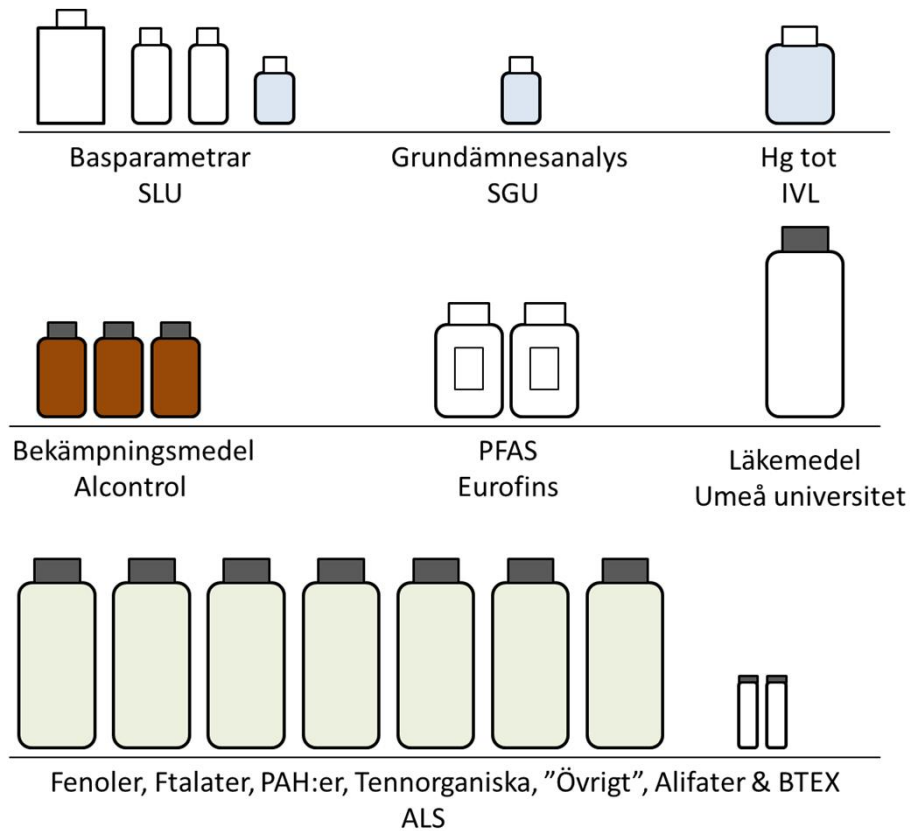


National: 33 wells in unconfined conditions, catchment in urban area, different geological settings

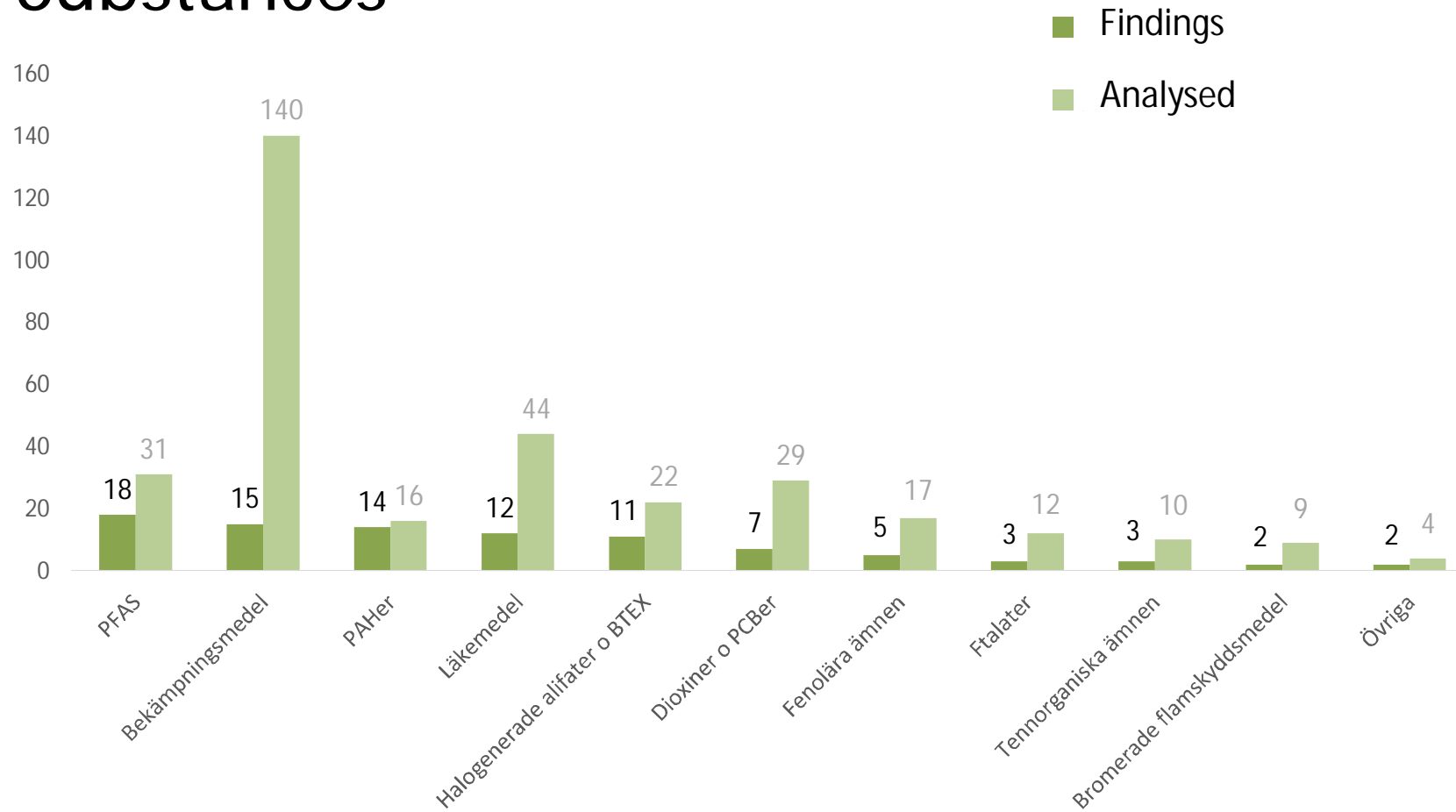


County boards : 44 wells
Extra parameters
Brominated flame retardants (PBDE)
Dioxins & dioxin type PCBs

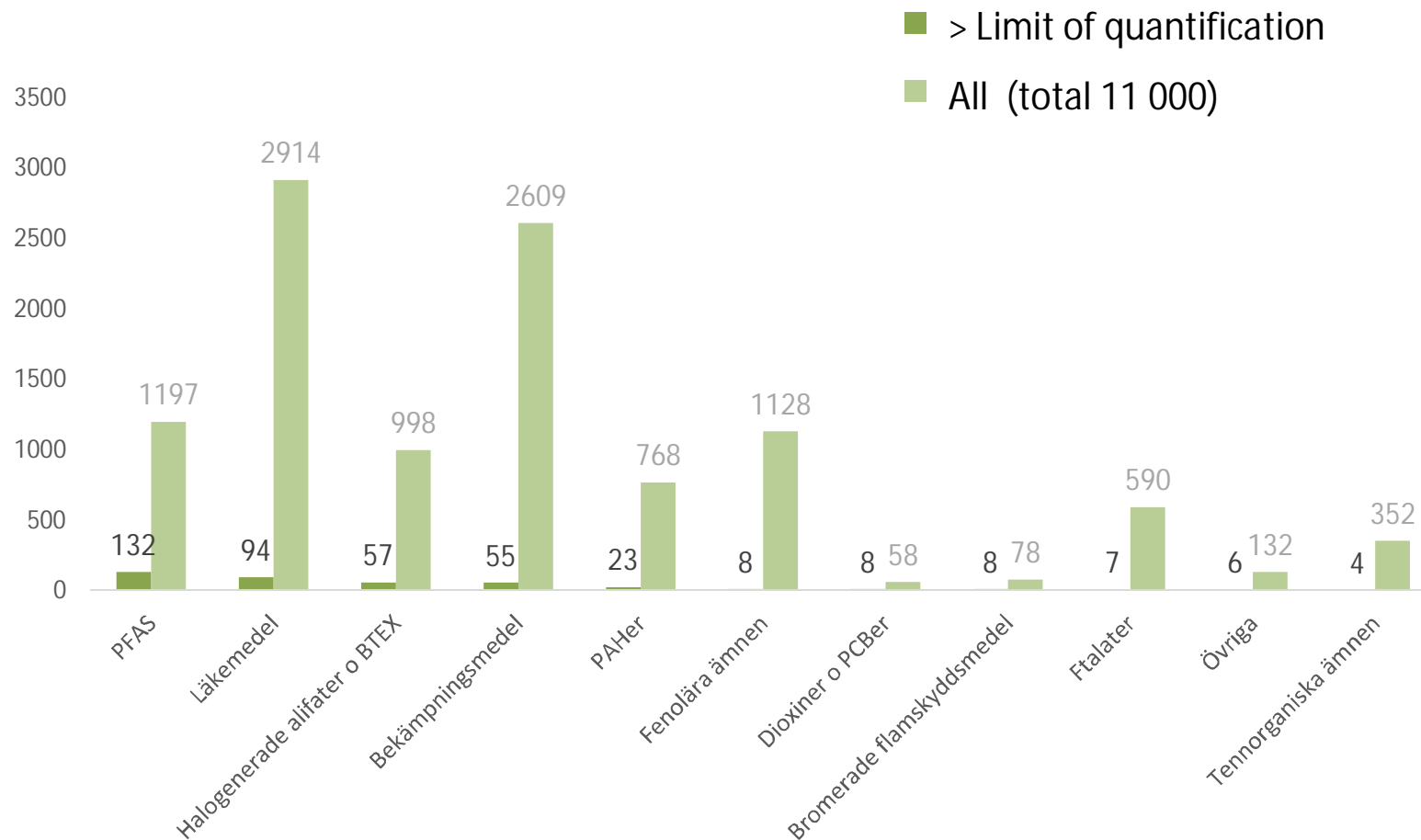
Different laboratories



Substances

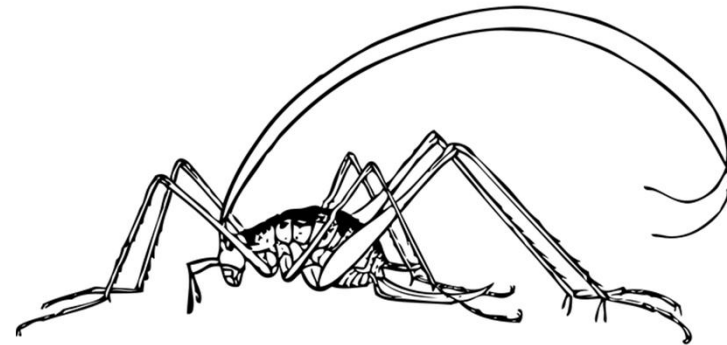
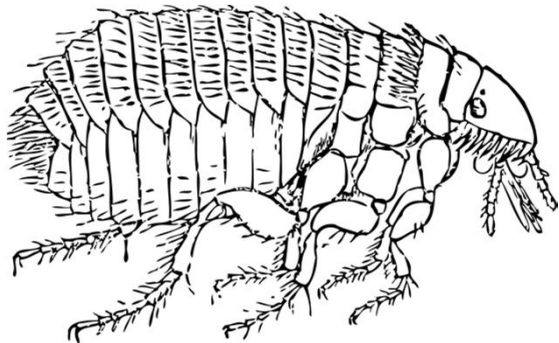


Samples



Results - pesticides

- Found in 27 of 48 wells
- BAM in 25
- Atrazine + desethylatrazine (from "Totex strö") was also common (9 + 8 findings)
- Highest conc - ETU (Etylentiourea): 0,27 ug/l



Results - pesticides

Ämne (ug/l)	Median, alla prover	Antal prover	Antal fynd	Min, end. funna	Max, end. funna
<u>2,4-diklorfenoxisyra</u>	<0,003	48	1	0,006	0,006
2,4-Diklorprop	<0,003	48	1	0,004	0,004
<u>AMPA</u>	<0,004	48	1	0,042	0,042
Atrazin	<0,003	50	9	0,001	0,009
BAM	≤0,007	48	25	0,004	0,11
<u>Bentazon</u>	<0,003	48	2	0,007	0,029
Desetyl-atrazin	<0,003	48	8	0,001	0,038
Dieldrin	<0,00067	2	1	0,00034	0,00034
Endrin	<0,0023	2	1	0,0016	0,0016
ETU (Etylentiourea)	<0,01	37	1	0,27	0,27
Kloridazon	<0,003	48	1	0,003	0,003
Mekoprop	<0,003	48	1	0,025	0,025
Pentaklorbensen	<0,015	2	1	0,03	0,03
<u>Pirimikarb</u>	<0,003	48	1	0,003	0,003
Simazin	<0,003	49	1	0,005	0,005

Results - PFAS

- Difficult to sample
- 18 substances found (of 31 analysed)
- Found in 2/3 of the wells
- 6:2 FTS only in one sample
- Highest conc - PFOS: 47 ng/l



Results – halogenated aliphates+ BTEX

- Trichloroethene (TCE) in 15 of 51 samples (most common)
- Tetrachloroethene (PCE) in 7 of 51 samples
- Threshold value 10 ug/l for tri+tetra was not exceeded
- TVs for 1,2-dikloreten, bensene and sum trihalometaner were not exceeded
- cis-1,2-dikloreten second most common



Results - pharmaceuticals

- 94 samples above limit of quantification
- 12 substances above limit of quantification
- Highest conc – Paracetamol 289 ng/l



Results - pharmaceuticals

Most common :

- Karbamazepin (antiepileptika)
 - Flukonazol (svampmedel)
 - Trimetoprim (antibiotikum)
 - Paracetamol
-
- No coffeine!



Soils

Brunn	Över rapp.gräns
Olofström, br 1	17
Olofström, br 4	9
Olofström, br 5	13
Gävle, br 536	11
Gävle, br 537	16
Gävle, br 538	15
Gävle, br 539	12
Värnamo, br 2	8
Värnamo, br 3	7
Enköping, br 1	9
Enköping, br 2	10
Norrtälje	4
Hammarby	20
Märsta	5
Rotsunda	14
Ulriksdal	13

Totalt: 183 findings
Snitt: 11 per well

Bedrock

Brunn	Över rapp.gräns
Kristianstad, B1	5
Kristianstad, B5	3
Kristianstad, B8	6
Trelleborg, P15	7
Trelleborg, P16	5
Trelleborg, P3	6
Trelleborg, P4	2
Trelleborg, P2	11
Visby, P26	11
Visby, P28	12
Visby, P20	8
Visby, P9	4
Visby, P7	2
Visby, P12	4
Södertälje	12

Totalt: 98 findings
Snitt: 7 per well

Conclusions

Substances most often found were:

1. PFAS
2. Pharmaceuticals
3. Halogenated aliphatics + BTEX
4. Pesticides

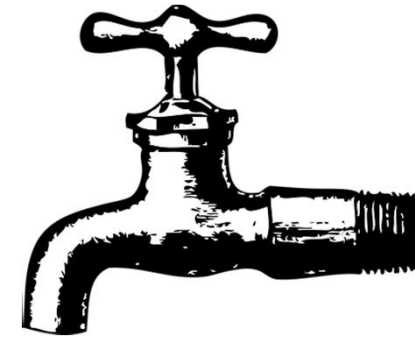


PFAS was found above LoQ in 2/3 of all monitored wells, but it was difficult to get reliable results. Recommended to take verifying samples before measures are implemented

More findings of hazardous substances in sand/gravel aquifers than in bedrock aquifers



In general low concentrations (from a human health perspective), but high variety of hazardous substances found



Summarised in SGU-rapport 2019:02

In swedish

SGU
Sveriges geologiska undersökning

Start Produkter Grundvatten Mineralnäring Samhällsplanering

Start / Produkter / Publikationer / Nypublicerat

Geologiska data	+
Kartor	+
Publikationer	-
Nypublicerat	-
Publicerat 2018	
Publicerat 2017	
Publicerat 2016	
Publicerat 2015	
Om tidigare kartserier	
Söktjänster	+
Informationsmaterial	+
Kundtjänst	+
Låna en geolog	
Kurser	+
SGUs vägledningsportal	



Nypublicerat

Här presenteras det material som månaderna. Äldre rapporter återfinns samt i GeoLagret.

Du når även rapporterna genom GeoLagret. Samtliga länkar på den här sidan öppnas i

> Årets publikationer i GeoLagret.

Februari

Miljögifter i urbant grundvatten

Johan Carlström & Lena Maxe

februari 2019

SGU-rapport 2019:02
Diarie-nr: 35-782/2016



SGU
Sveriges geologiska undersökning

NATUR
VÅRDS
VERKET



Thank you.

sgu.se | @sguSverige



Provplatser

Stad	Brunnar	Brunnsdjup [m u my]	Geologisk miljö	Jord / berg
Kristianstad	4 st	50 - 106	Sandsten	Berg
Gävle	4 st	12 - 29	Isälvsediment	Jord
Olofström	3 st	9 - 31	Isälvsediment	Jord
Värnamo	2 st	37 - 45	Isälvsediment	Jord
Visby	6 st	46 - 68	Kalksten	Berg
	1 st	Ca 5	Kalksten	Berg
Trelleborg	4 st	35 - 70	Kalksten	Berg
	1 st	29	Kalksten	Berg
Enköping	2 st	18 - 30	Isälvsediment	Jord
Norrtälje	1 st	40	Morän (?)	Jord
Södertälje	1 st	100	Granit/granodiorit	Berg
Märsta	1 st	-	Isälvsediment	Jord
Ulriksdal	1 st	-	Isälvsediment	Jord
Hammarby	1 st	-	Isälvsediment	Jord
Rotsunda	1 st	-	Isälvsediment	Jord