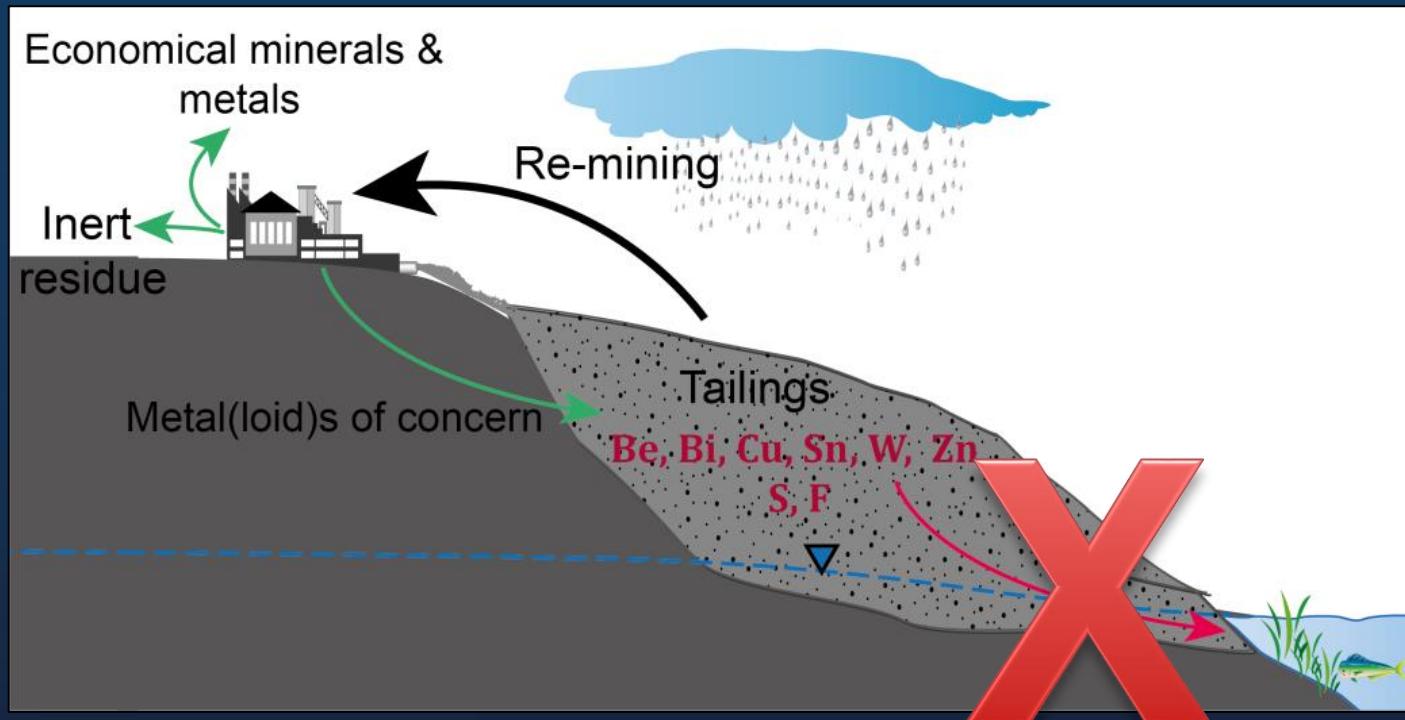




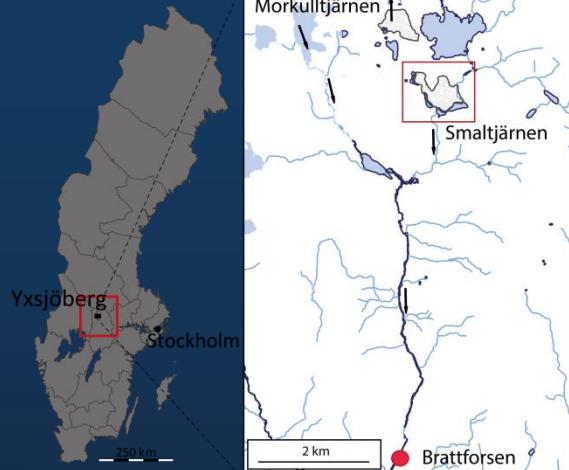
Re-mining som SANERINGSMETOD i Yxsjöberg

Lina Hällström
Applied Geochemistry
Luleå University of Technology

Re-mining as remediation method



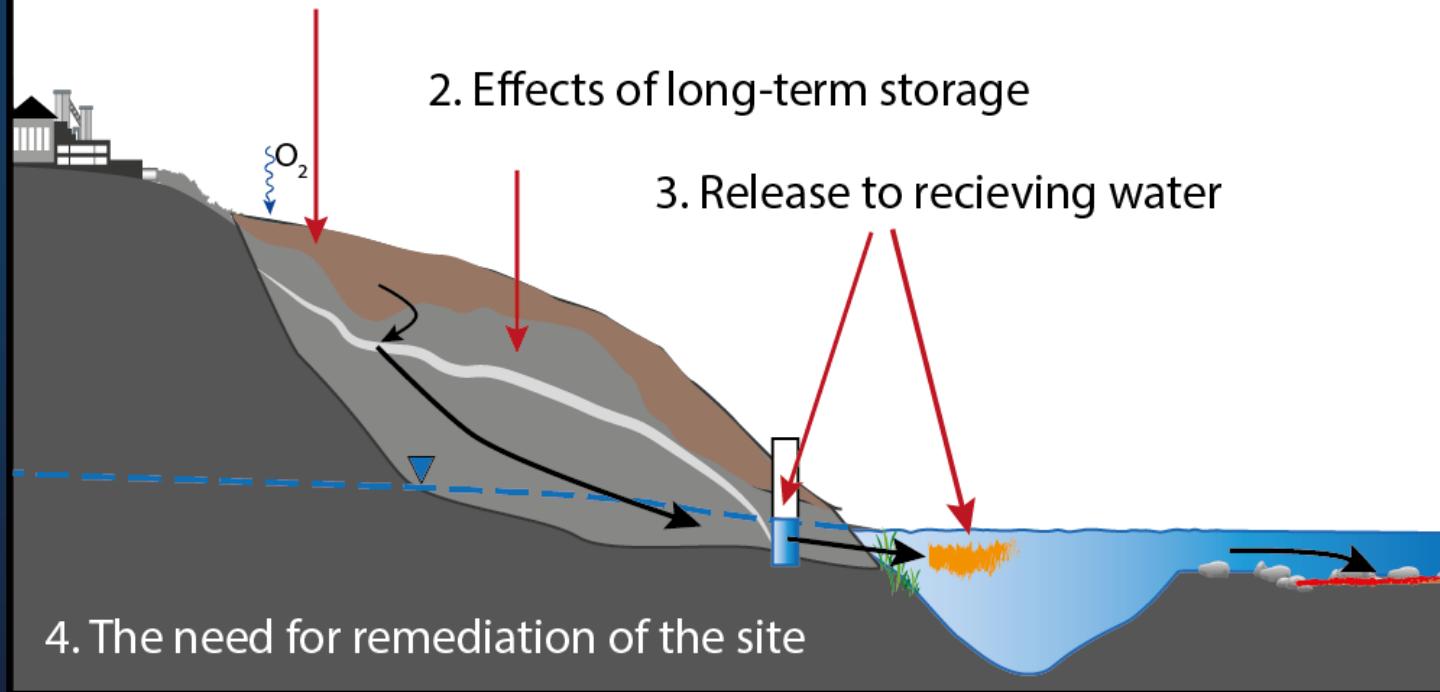
Yxsjöberg mining Area – W skarn tailings



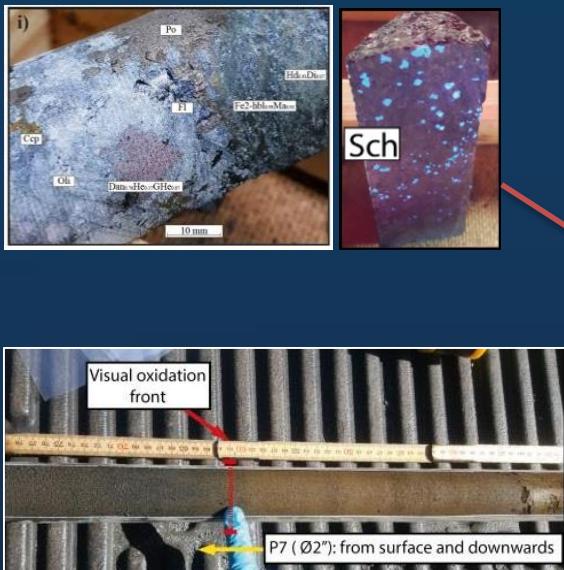
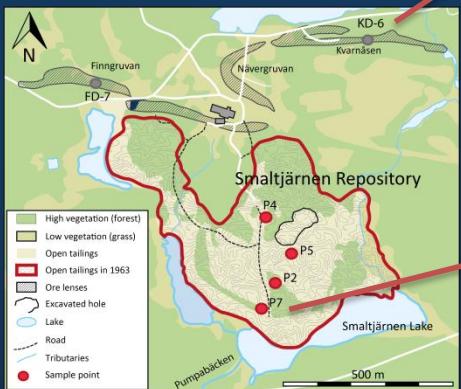
- Three skarn ore lenses
- W, F and Cu was mined
- 1918-1920 & 1935-1963 (1969-1989)
- **Smaltjärnen & Morkulltjärnen**
- 2.8 million tons of tailings
- No dams controlling the repository
- Sludge cover (1993)
- Elevated conc. of W & Be
- MIFO Class 1

The environmental aspect

1. Geochemical characterization of the tailings



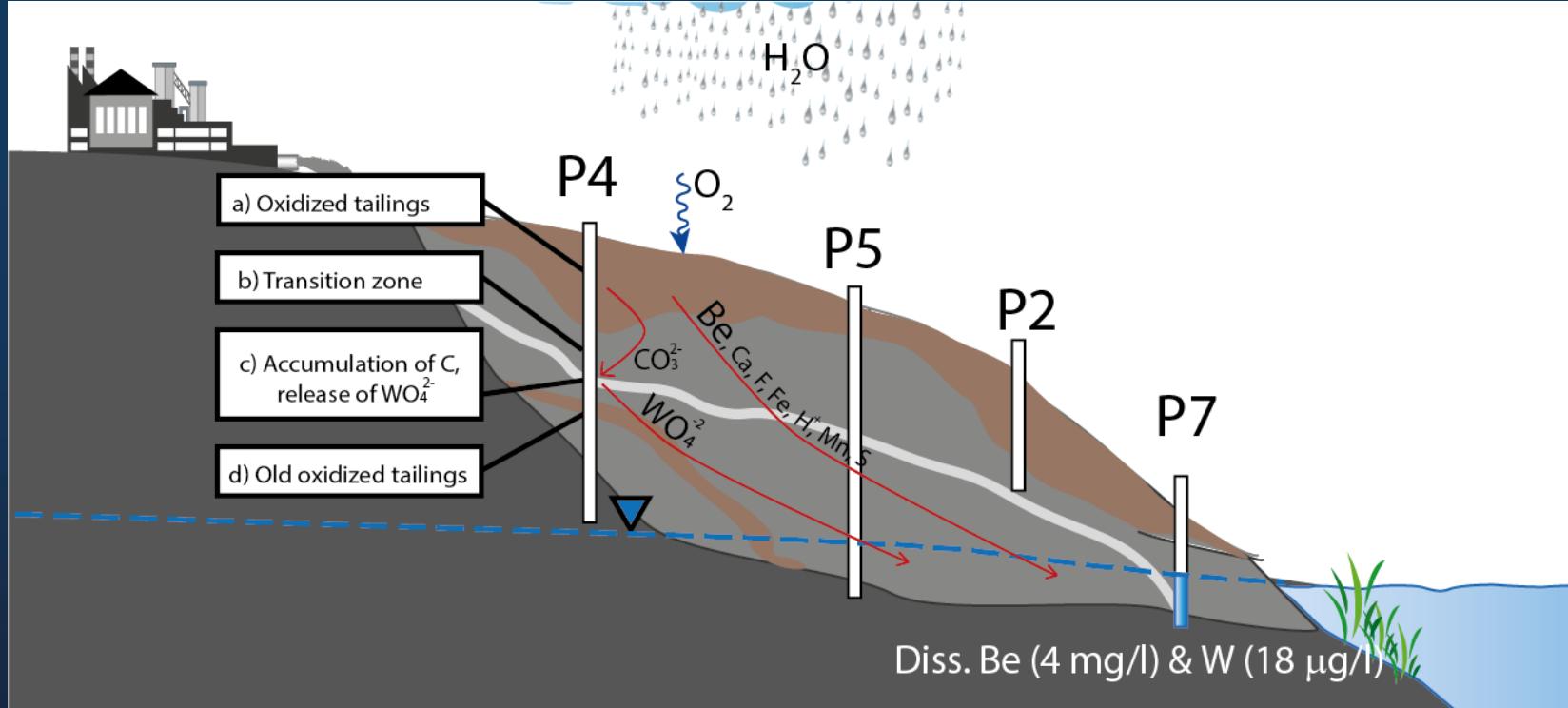
1. Geochemical characterization



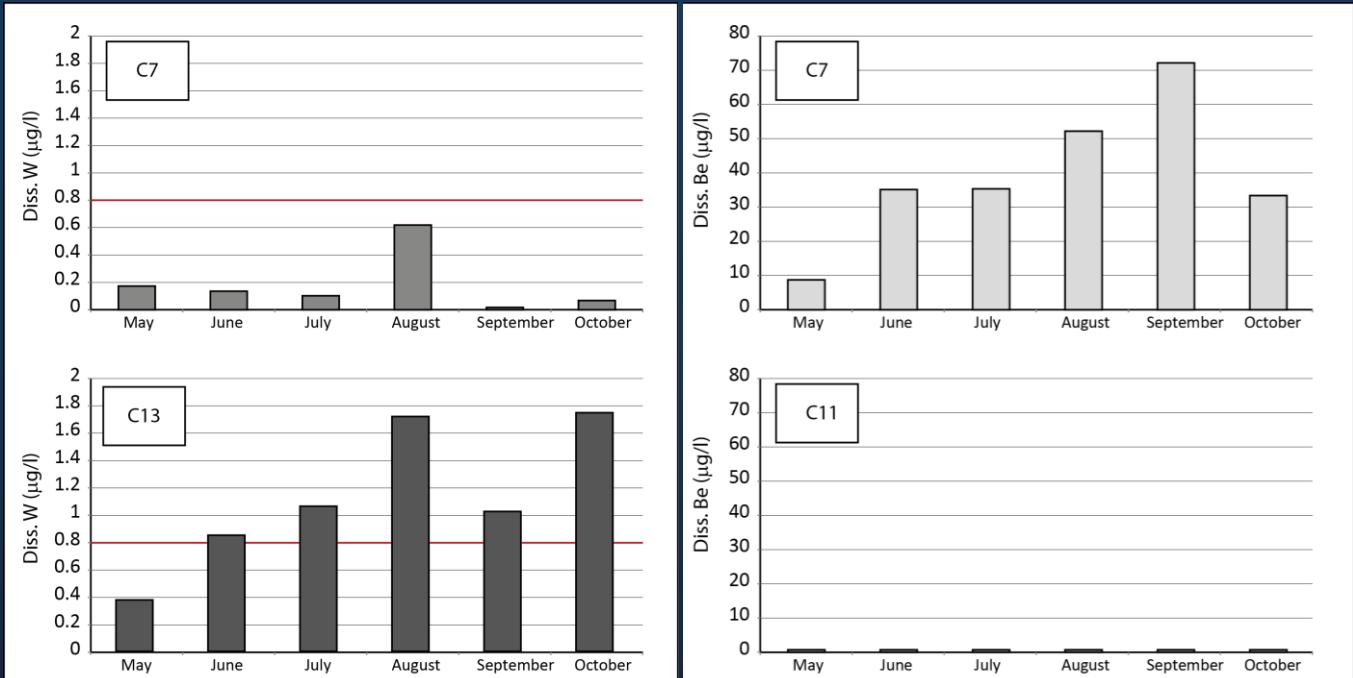
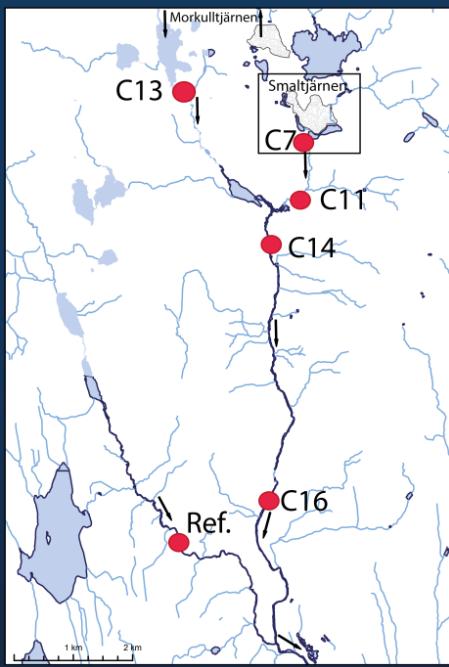
	EMC wt. %.	Be	Bi	Cu	Sn	W	Zn
		% of total content in the tailings					
Hedenbergite	30	35	1	12	2	49	
Quartz	16						
Oligoclase	15	14				1	1
Ferrohornblende	13	9		36	3	19	
Calcite	5.7						
Biotite	4.0						
Fluorite	3.6						
Grossular	3.0	1			5		
Pyrrhotite	2.4		1				2
Magnetite	1.8						
Danalite	0.3	41	8	1			42
Chalcopyrite	0.2			98			
Bismuthinite	0.1			92			
Pyrite	0.1						
Scheelite	0.1						92
Cassiterite	0.03					48	

The stability and quantity of the hosting minerals plays an important role

2. Effects of long-term storage



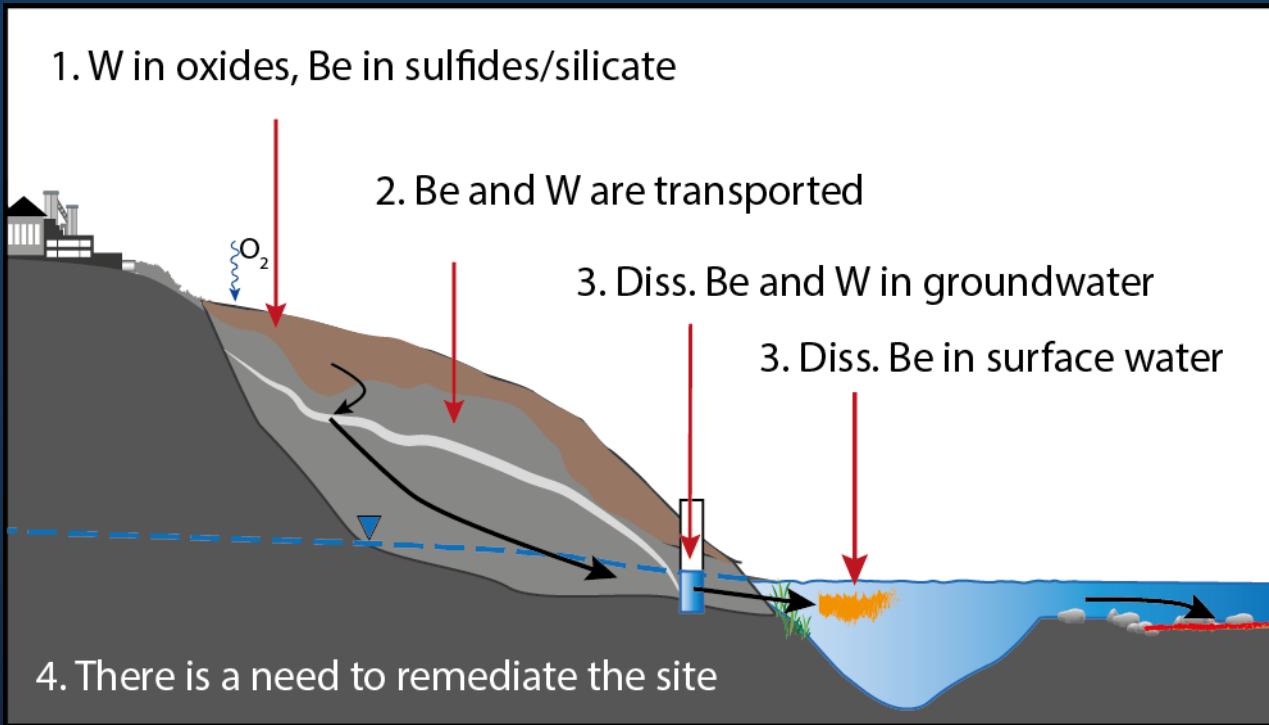
3. Release of W to surface water



Diss W

Diss Be

4. Is there a need for remediation?



CONCLUSION

- Source-Transport-Recipient
- Important to know the metal hosting minerals
 - Complex mineral matrix
 - W (oxides) leach from Morkulltjärnen
 - Be (sulfides/silicates) leach from Smaltjärnen

Re-mining could be a suitable remediation method



LULEÅ
TEKNISKA
UNIVERSITET

CAMM²
CENTRE OF ADVANCED MINING AND METALLURGY

ERA·MIN
NETWORK ON THE INDUSTRIAL HANDLING
OF RAW MATERIALS FOR EUROPEAN INDUSTRIES



VINNOVA