

WASTE KHORO 2019: Asbestos and Land Remediation Summit

18-20 September 2019



"Good Green Deeds towards a Recycling Economy and Sustainable Land Remediation"

CONTAMINANTS: The New Wave

Contaminants of Emerging Concern, and Emerging Contaminants

**Question today
imagine tomorrow
create for the future**



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Emerging Contaminants

'new' substances that were not previously known or that have only recently started to appear in scientific literature

Contaminants of Emerging Concern

substances known to exist but for which environmental contamination issues have not been fully realised, or concerns raised much more recently

Lifecycle of Emergence

emerging issues around 'traditional' contaminants alongside increasing knowledge of:

- sources
- fate and exposure
- toxicology etc.



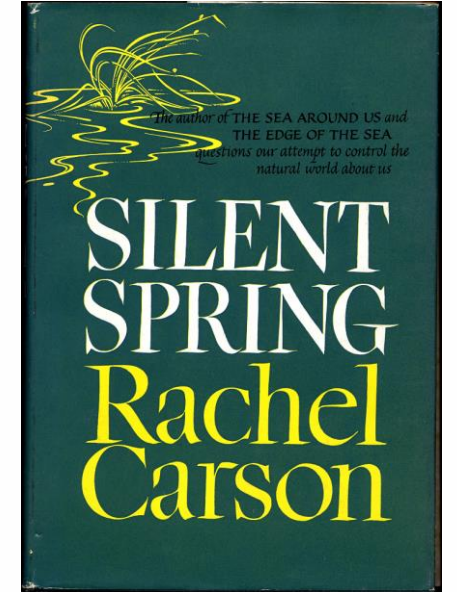
The Watershed?

© flickr.com [U.S. Fish & Wildlife Service Headquarters], 2013



Dichlorodiphenyltrichloroethane (DDT)

- ‘Safe’ replacement for arsenic
- Disappearance of bird species (*hence title*)
- Heavily criticised for daring to challenge societal benefits
- Research confirmed the risks
- DDT banned, circa 100yrs after synthesis began

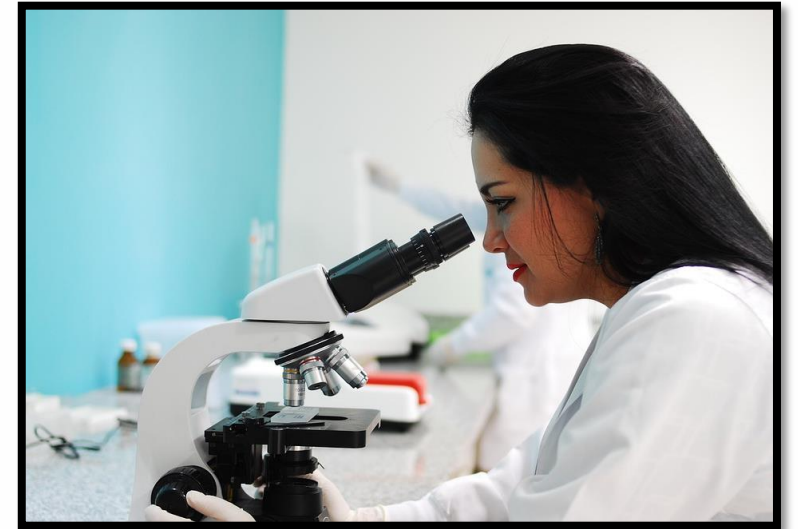




What We've Gained...



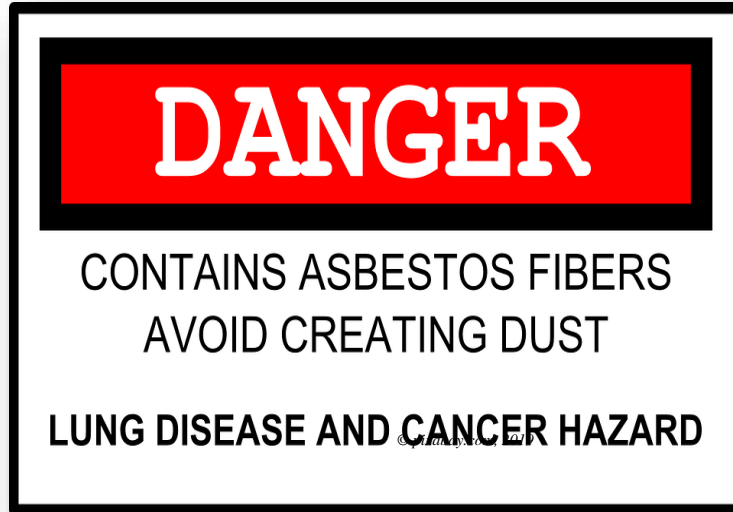
Environmental Legislation



Increased Research

- Introduction and refinement of legislation
- Increased research and availability of robust scientific studies
- Focus on environmental concerns and toxicology
- Ongoing improvement with advancing knowledge

What We've Gained...



Maturity of Contamination Assessment



Heightened Awareness

- Maturity of understanding of 'emerging' contaminants:
- Development of various assessment techniques
- Acceptable exposure versus clean-up
- Increasing global awareness and public driven "call to arms"

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What is emerging is relative

The world does not stand still!



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Tungsten

USEPA issued a Technical Fact Sheet in 2017

Driver - increased use of tungsten in bullets.

Still insufficient tox information to derive soil and groundwater screening values (exp Indiana).

Naturally occurring in George, Western Cape



**Do we just
bury our
heads in the
sand?**

Why do emerging contaminants matter?



Compounding Existing Issues



Food Scarcity



© borgenproject.org, 2015



© pixabay.com, 2019

Water Shortage

Lack of Desirable Space



© pixabay.com, 2019



© pixabay.com, 2019

Healthcare



Responsible Stewardship





(Some of) What's Lurking?

**Various degrees of
'emergence'**





Polychlorinated
Biphenyls (PCBs)

Polybrominated
Biphenyls (PBBs)

Polybrominated
Diphenyl Ethers
(PBDEs)

Per- and Polyfluoroalkyl Substances (PFAS)





Thousands of different compounds; wholly synthetic (i.e. man made)

Domestic and industrial uses

“Forever chemicals”

Insulators and Flame Retardants





Active Pharmaceutical Ingredients (APIs)

APIs detected in all analysed countries; differing proportions per continent

Initial analysis: Low-Middle Income Countries = Highest Sum API concentrations

Most frequent API in Africa: Ciprofloxacin (antibiotic)

SETAC Europe 29th Annual Meeting

26–30 May 2019 | Helsinki, Finland

Abstract Book





Next Generation Pesticides

Example :
Neonicotinoids

Food security and
agricultural efficiency

Smaller quantities; at
what cost?



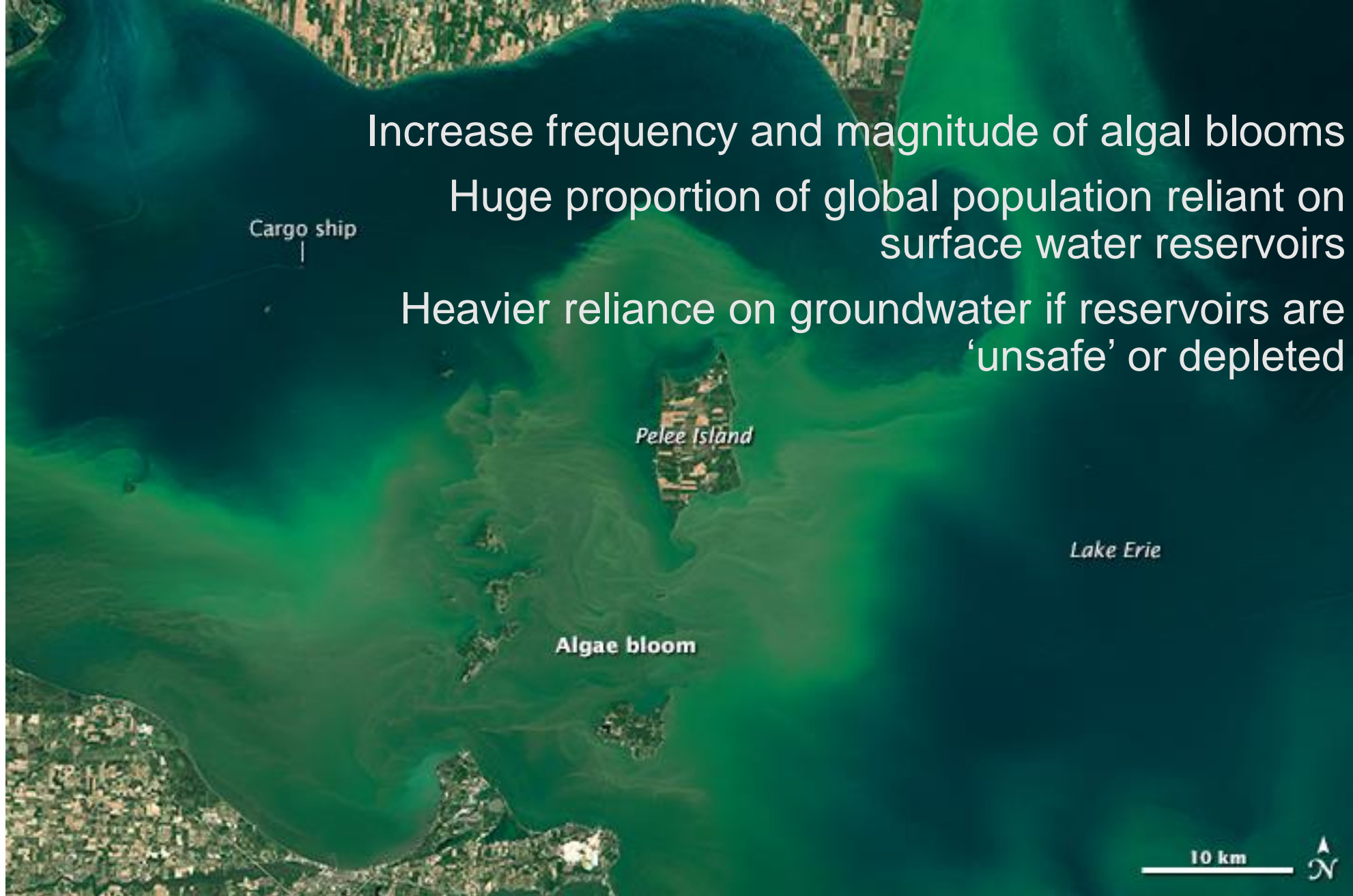


Cyanotoxins

Increase frequency and magnitude of algal blooms

Huge proportion of global population reliant on surface water reservoirs

Heavier reliance on groundwater if reservoirs are 'unsafe' or depleted



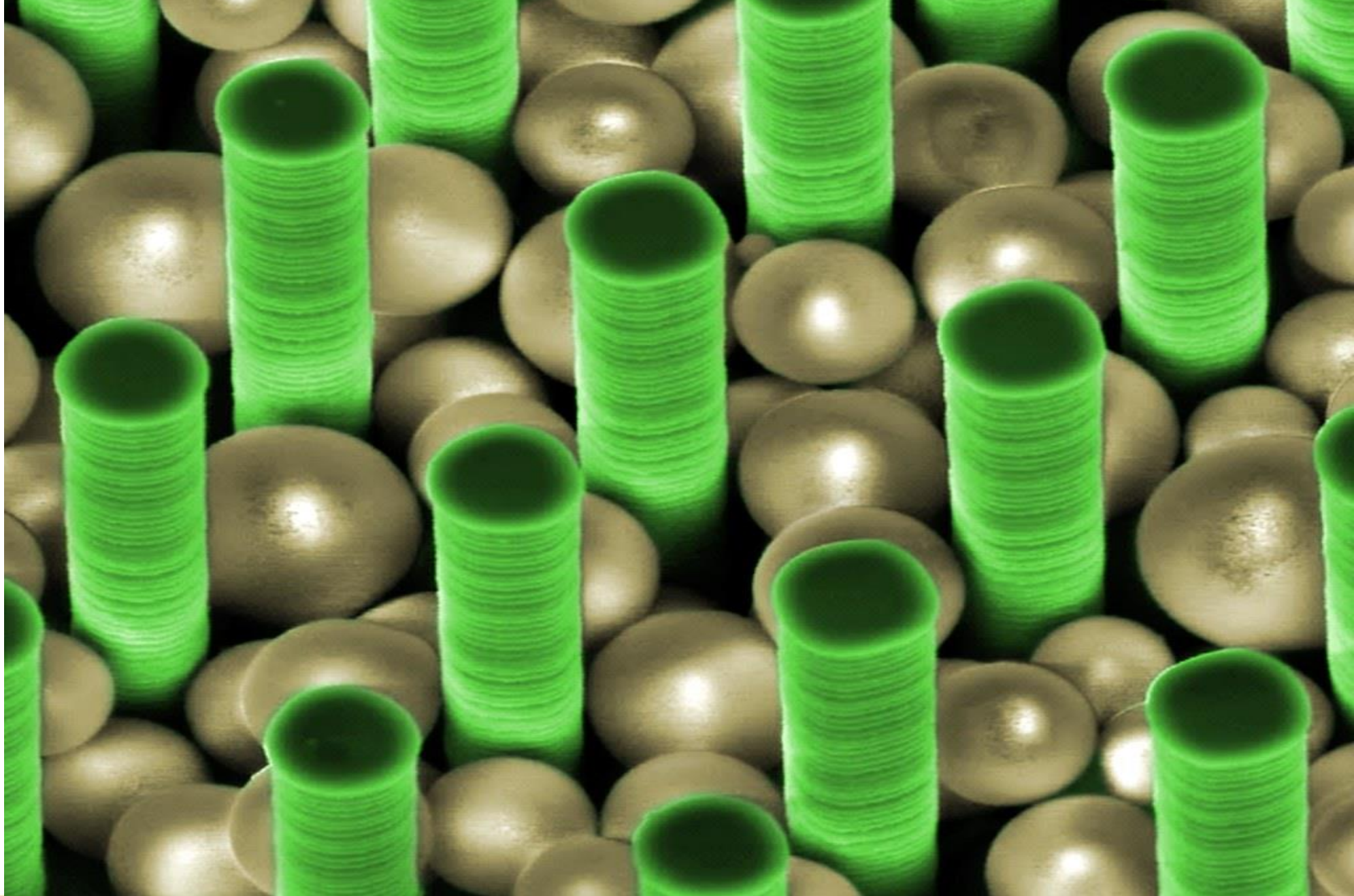


Nanoparticles

One dimension
<100nm

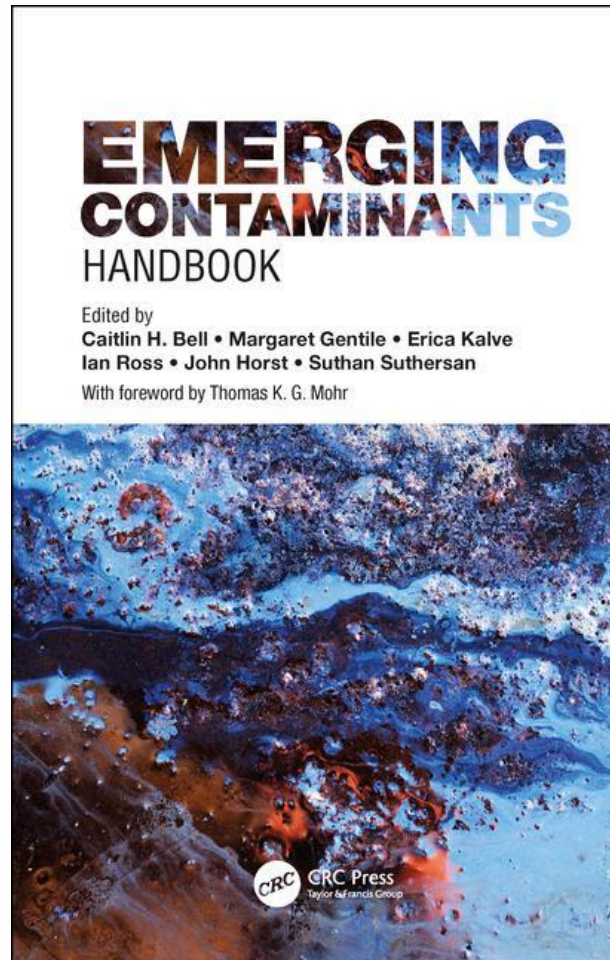
Conventional
filtration ineffective

Presently more
questions than
answers





Emerging Contaminants Handbook, January 2019



Emerging Contaminants Summit, Denver 2020





THANK YOU!