arag✳rn

EUs kommende jordlov
– hvordan måler vi for Soil Health?
ATV vintermøde 4-5. marts 2025

Xenia Trier /KU : EUs jordlov
Peter Mortensen / Eurofins : eDNA målinger

Funding

**EU Soil Mission / ARAGORN
EU Horizon / PARC
Danske PFAS Taskforce + PFAS Center**

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UNIVERSITY OF
COPENHAGEN

arag✳rn objectives

- **To support the Soil Mission Aims**: Reduce hot-spot soil pollution and enhance restoration in urban, peri-urban and rural environments across Europe – while enabling other EGD objectives of biodiversity, climate, CE. Focus on **persistent pollutants** and support **landowners decision-making**.

- **to collect, monitor, test remediation/restoration and share data**
  - map potentially and known contaminated sites,
  - gather information on sampling, methods, remediation, RA/SEA, co-creation,
  - optimise chemical monitoring methods/monitoring strategies to be fit-for-purpose for commercial laboratories and landowners decision-making
  - test remediation technologies: From regrettable → restorative remediation
  - provide tools and technical guidance documents to support decision-making
  - support development of the Soil Monitoring and Resilience Directive (SMRD)
- **to enable land managers in Europe to manage soil pollution by**
  - prioritization, planning and co-creation with local community and authorities
  - informed decisions on actions to remediate/restore polluted lands
  - invest in activities to remediate and restore land

Aragorn Horizon - combat soil contamination in Europe (aragorn-horizon.eu)

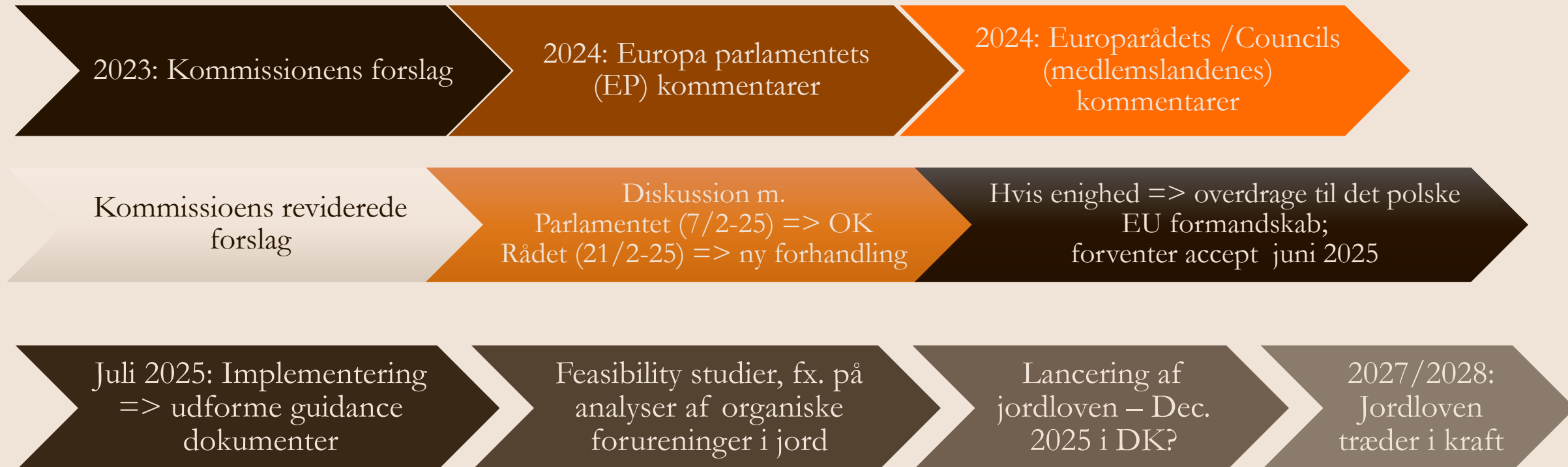| PFAS : (Per- and Polyfluorinated Substances) |
| --- |
| OCBs: (Organochlorines and Organobromines) |
| PETCO; (Petroleum and Coal Compounds) |
| Metals: (Hazardous Metals) |

EUs 'Soil Monitoring and Resilience Directive (SMRD)'

- 2006: Forsøg på en lov – 2014: opgivet..
- European Green Deal 2020
  => Soil Thematic Strategy (STS); link til Kemikaliestrategien (CSS), CE, BDS, CAP
- => 2023: Kommissionens forslag til en Europæisk jord-lov (SMRD)
- => Triologi processen starter mellem Kommissionen, Parlamentet og Rådet

2023: Kommissionens forslag	2024: Europa parlamentets (EP) kommentarer	2024: Europarådets /Councils (medlemslandenes) kommentarer

Kommissioens reviderede forslag	Diskussion m. Parlamentet (7/2-25) => OK Rådet (21/2-25) => ny forhandling	Hvis enighed => overdrage til det polske EU formandskab; forventer accept juni 2025

Juli 2025: Implementering => udforme guidance dokumenter	Feasibility studier, fx. på analyser af organiske forureninger i jord	Lancering af jordloven – Dec. 2025 i DK?	2027/2028: Jordloven træder i kraft

SMRD: Monitorering + Resiliens

- Beskyttelse af *mennesker* og *miljø*, fremme genanvendelse af jord=> reducere land-take
- Vurderinger baseret på *risici*
- Forventes alignet med andre lovgivninger, fx vandrammedirektivet

- Forureningstyper:
  - Hot-spot : Landene laver selv jordkvalitetskriterier, kontrollerer og risikohåndterer
  - Diffus : EU watchlister til overvågning; *ikke* kontrol værdier i starten
- Harmoniserede europæiske guidelines til prøvetagning, analyser, vurderinger, ..
  - tage højde for naturlige/anthropogene baggrundsniveauer, forskellige beskyttelsesniveauer
- Målinger af enkeltstoffer + total-analyser; varierer for Tier 1/2/3

- Fysisk-kemiske parametre, erosion, kemisk forurening (fx metaller, organiske forureninger; total vs. biotilgængelig mængde), mikrobiel status (fx eDNA)

EC, EP og Rådets forskellige inputs

- **EC and Pollution**:
  - Contaminated sites (Risk assessment)
  - Diffuse pollution (metals, organic pollutants, pesticides), **background pollution**

- **EP and pollution pollution**:
  - Contaminated sites (Risk assessment)
  - Diffuse pollution (tier 1 - metals, organic, **PFAS**, **pesticides**, **tier 2 - Pharmaceuticals and veterinary products, tier3 - microplastics**), **watch list**

Soil Monitoring Law (SML)

05/07/2023   10/04/2024   17/06/2024

EC, EP og Rådets inputs – ex. kemiske forureninger

Annex I: soil indicators

SML. Commission version

Part B: soil descriptors with criteria for healthy soil condition established at Member State level		
Soil contamination	- concentration of heavy metals in soil: As, Sb, Cd, Co, Cr (total), Cr (VI), Cu, Hg, Pb, Ni, Tl, V, Zn (µg per kg) - concentration of a selection of organic contaminants established by Member States and taking into account existing concentration limits e.g. for water quality and air emissions in Union legislation	Reasonable assurance, obtained from soil point sampling, identification and investigation of contaminated sites and any other relevant information, that no unacceptable risk for human health and the environment from soil contamination exists Habitats with naturally high concentration of heavy metals that are included in Annex I of Council Directive 92/43/EEC[3] shall remain protected.

SML. Council version

Part B: soil descriptors with criteria for healthy soil condition established at Member States level		
Soil contamination	Concentration of heavy metals in soil: As, Sb, Cd, Co, Cr (total), […], Cu, Hg, Pb, Ni, Tl, V, Zn (mg per kg) concentration of a selection of organic contaminants established by Member States and taking into account existing concentration limits e.g. for water quality and air emissions in Union legislation	Reasonable assurance, obtained from soil point sampling, identification and investigation of contaminated sites and any other relevant information, that no unacceptable risk for human health and the environment from soil contamination exists. Natural and anthropogenic background levels should be taken into account in the risk assessment. If natural background is the only reason leading to unacceptable risks, then such soil should be deemed as compliant with healthy soil criteria provided it is managed in such a way that there is no unacceptable risk for human health. Habitats with naturally high concentration of heavy metals that are included in Annex I of Council Directive 92/43/EEC shall remain protected.

European Commission

EC, EP og Rådets inputs – ex. kemiske forureninger

Annex I: soil indicators

SML. Parliament version

Annex I Part A. Tier 1 Soil monitoring design

Soil contamination	Concentration of heavy metals in soil: As, Sb, Cd, Co, Cr (total), Cr (VI), Cu, Hg, Pb, Ni, Tl, V, Zn (µg per kg) Concentration of a selection of organic contaminants established by Member States and taking into account contaminants covered by Regulation (EU) No 2019/1021 and existing concentration limits e.g. for water quality and air emissions in Union legislation especially priority substances under the Water Framework Directive and related Environmental Quality Standards (Directive 2008/105/EC) and the Groundwater (Directive 2006/118/EC) Directives Plant protection product candidates for substitution and substances authorised under emergency regime, and biocides residues Per- and polyfluorinated alkyl substances (PFAS) total or sum of PFAS total	Top soil (0-10cm, 10-30cm (optional))

Annex I- Part B: Tier 2 soil monitoring design

Soil contamination	Pharmaceutical and veterinary products	

Annex I – Part C: Tier 3 soil monitoring design

Soil contamination	Concentration microplastics and nanoplastics	Top soil (0-10cm, 10-30cm (optional))

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European Commission

Hvilken type forureningsmålinger?

- EU/JRC overvågning af forurening: 10.000 data punkter over 6 år

- ARAGORN fast policy response med vægt på:
    - robuste + kost-effektive metoder
    - PFAS udbredt i Europa, tilstede i jord
    - forskellige watchlister (og aktioner) rettet mod Tier 1/2/3, evt. baseret på land-uses
    - alignment med andre reguleringer! Fx VRD

- PFAS målinger:
    - Organic Fluorine (OF) ved EOF
    - $PFAS_{43}$ ved target analyser
    - TFA: mere robust at måle i vand
    - PFAS pesticider? under diskussion..

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Assembled by ARAGORN
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input from Frank Thomas Lange (DVGW/ZeroPM)

February 4th 2025

State of the art of PFAS monitoring in soil

Information on the EC request

On December 19th ARAGORN PC, Xenia Trier, received a request from DG ENV/C, Mirco Barbero, Policy officer on soil, to support with knowledge on the state of art of analysis of PFAS in soil. Details of the request is shown below. The ARAGORN fast policy action team accepted the request on December 23rd 2024. The response is provided below.

Policy context	Support to the Soil Monitoring and Resilience Directive, input to the discussion of a soil watchlist for diffuse contamination, monitoring of contaminants in soil and related risk, transfer of persistent and mobile soil pollutants to ground and surface water – risk prevention vs. feasibility and cost
When	By end Jan 2025 if possible
Format	Executive summary of few pages (with key assumptions, reasoning and conclusions, figures and references); any comprehensive analysis, detailed figures or complete references in Annexes. Follow-up meeting before/after

Behov for mere viden til at understøtte jordloven (SMRD)

Knowledge gaps for policies

- Harmonisation on limit values, background values, threshold values, screening values, NOEC, LOEC, PNOEC, risk assessment, etc.

- Harmonisation on soil data (pollutants, soil properties) and metadata (soil extractable fractions, lab standards, soil depth, soil sampling, time, etc.) that can be used for the management of the contaminated sites (from identification of potential contaminated sites up to monitoring)

- Emerging pollutants (or watch list) an EU, country, regional level like PAHs, PCB, TPH, PFAS, POPs, pharmaceuticals, microplastics, and other metals than those included in the SML like rare metals, metalloids , etc.

- Assessment of remediation technologies by identifying soil pollutant, soil properties and type of remediation, in EU, country, region, etc

- Impact of anthropogenic activities in soil pollution (modelling the application of manure, fertilizers) as already done by us with Sewage Sludge (manuscript) manure, fertilizers) as already done by us with Sewage Sludge

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European Commission

Soil Health – Typiske deskriptorer

- Saltindhold (konduktivitet)
- Erosionshastighed
- Organisk indhold
- Vandbindingsevne
- Jordens tæthed
- Kornstørrelsesfordeling/tekstur

- Indhold af tungmetaller og udvalgte organiske forureningsparametre
- Indhold af næringsstoffer (N og P)
- pH

- **Biodiversitet** (flere alternativer, herunder metabarcoding)

eDNA applikationer
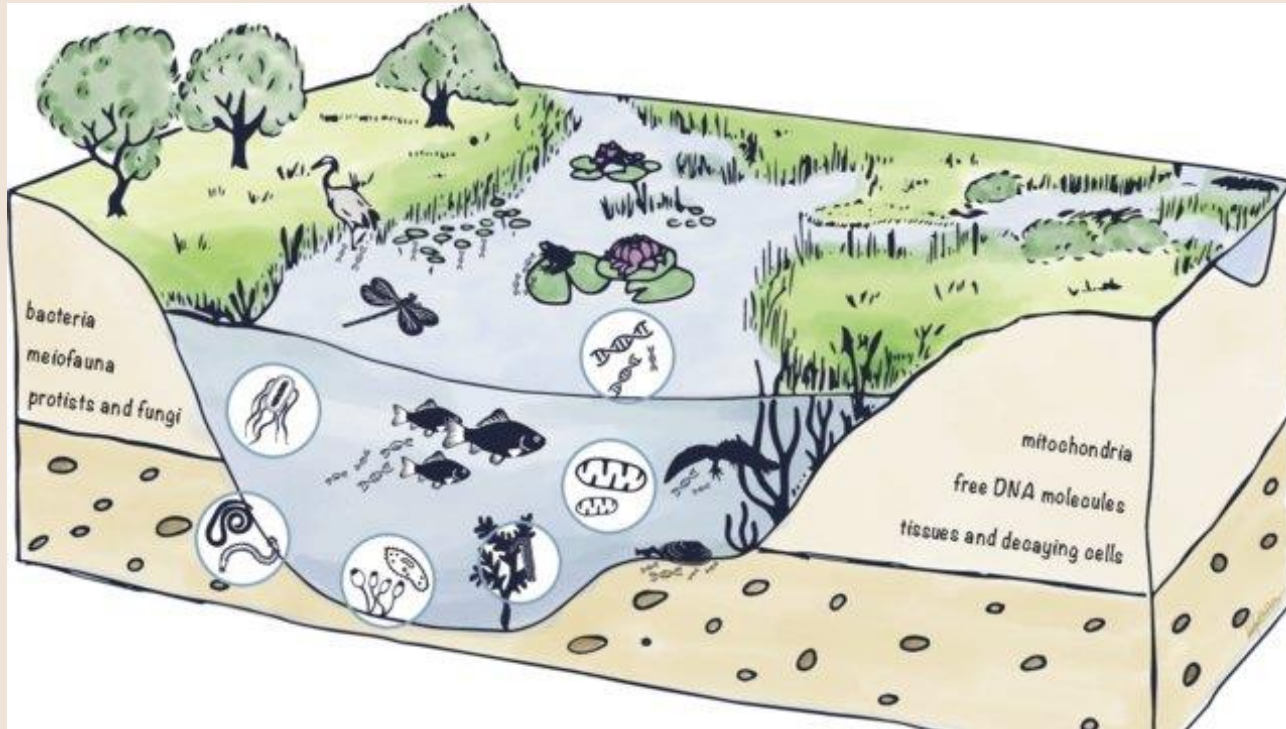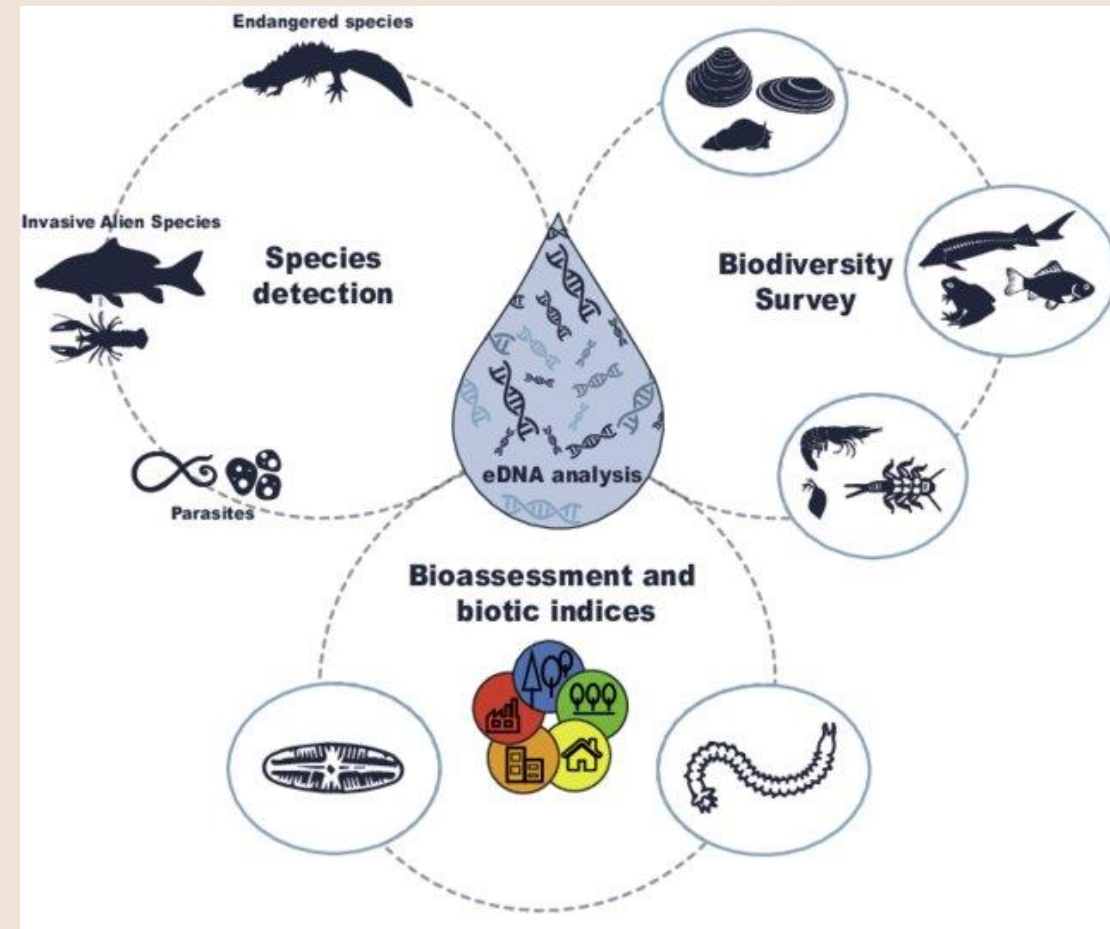
Metoder

PCR
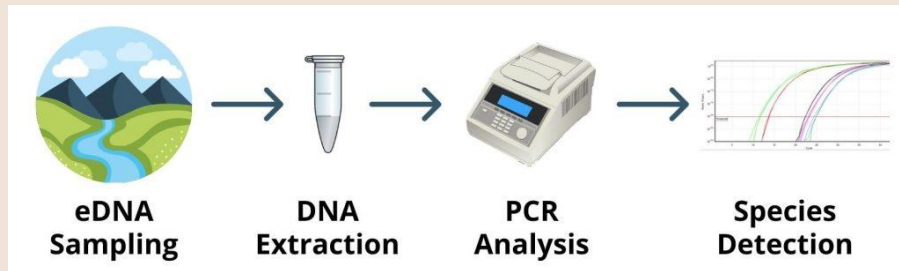
Detektion af specifikke arter

- SARS-CoV-2 monitorering

- Invasive arter (fx. japansk pileurt)

- Beskyttede arter (fx. stor vandsalamander)
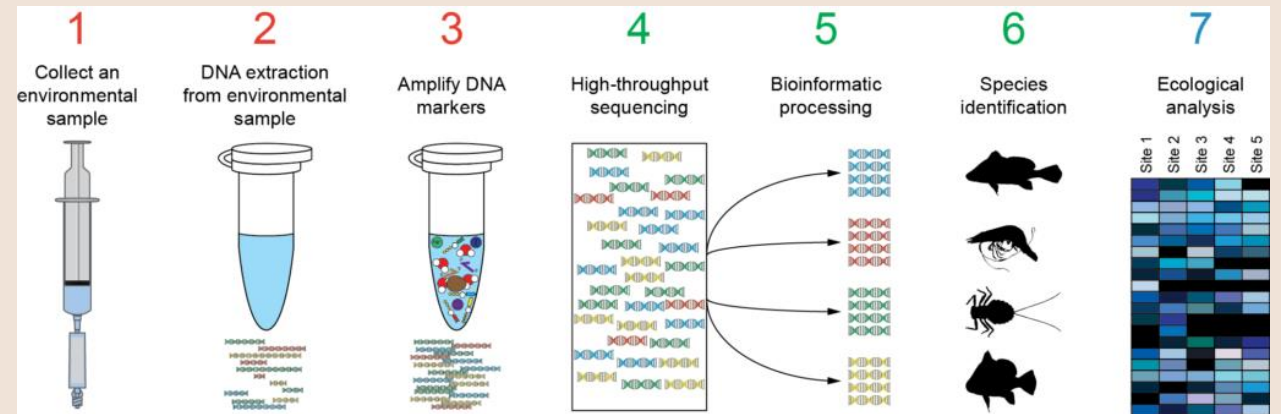
Metabarcoding

Amplifikation af DNA + NGS

- Bakterier, svampe

- Planter

- Hvirvelløse dyr

- m.m.

Real-time PCR, ddPCR, qPCR

NGS

Resultater af metabarcoding analyse

Workflow for soil samples

Total Soil DNA Extraction

↓

NanoDrop & Qubit

↓

QC
Library prep Illumina
MiSeq sequencing
(PE 300bp)

↓

Raw data (fastq)
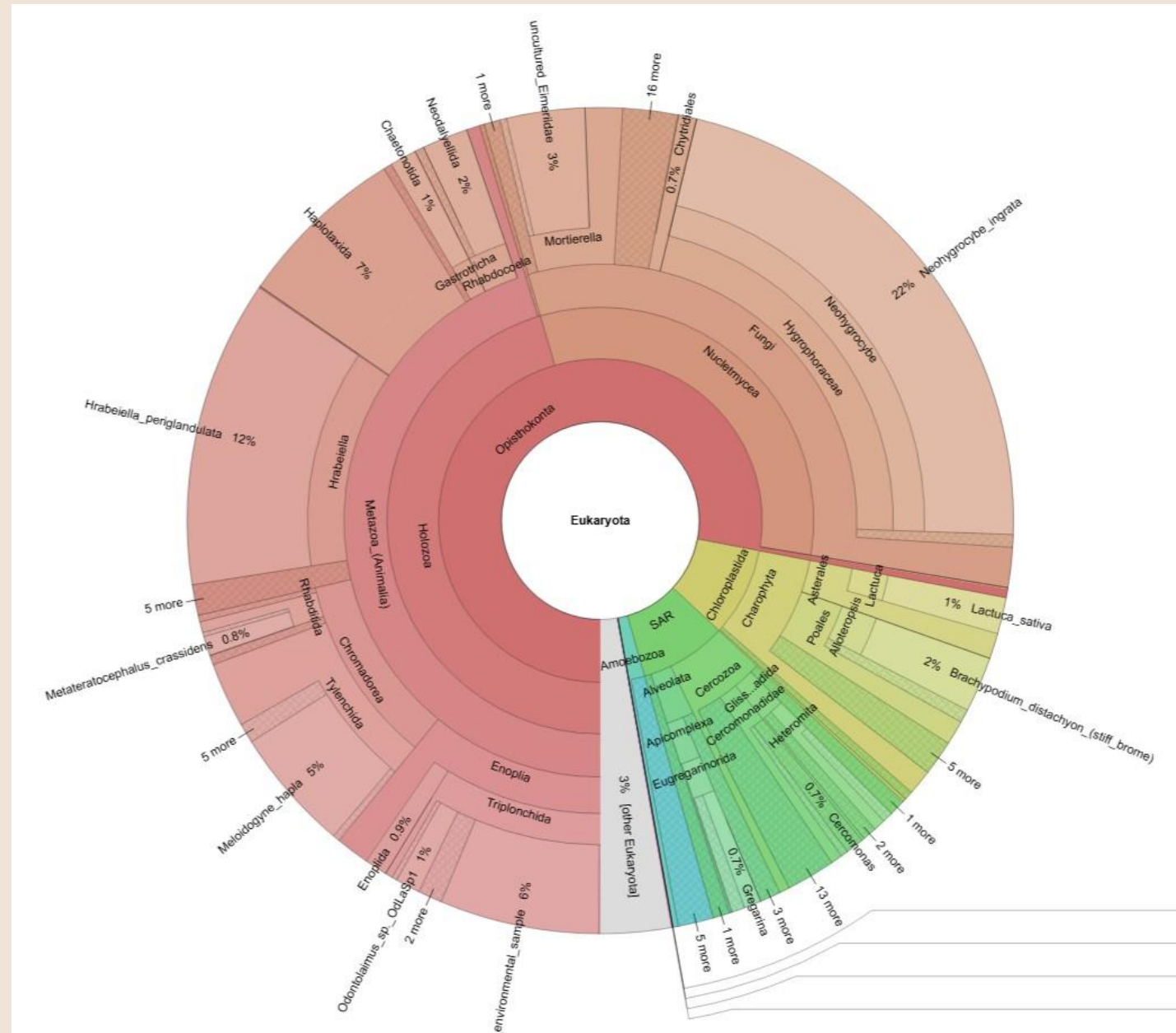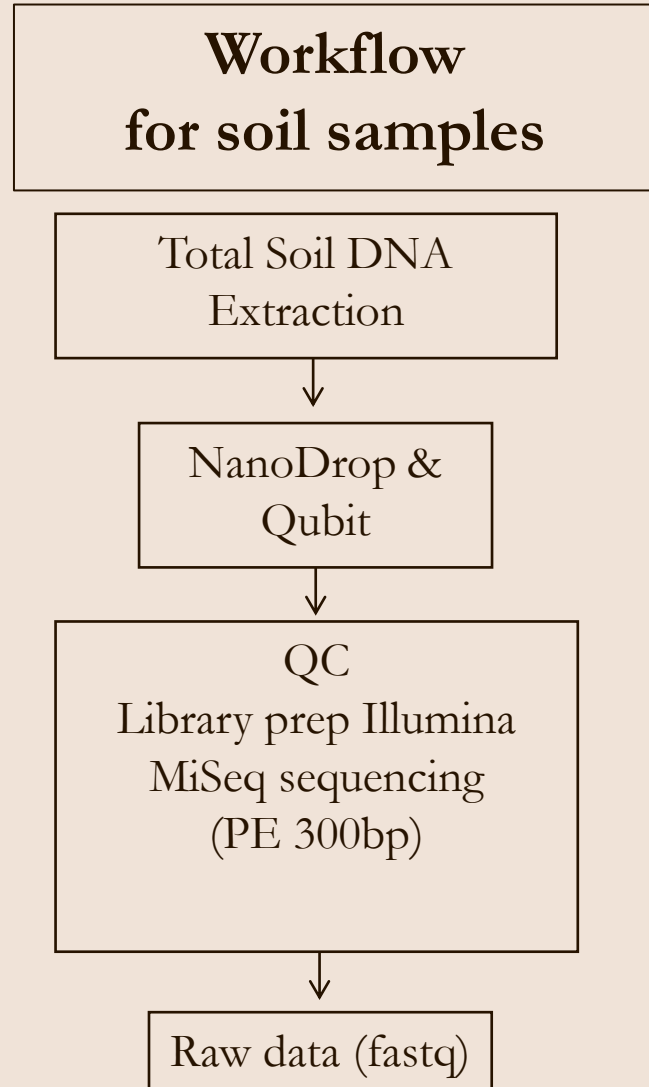
Effekten af remediering på jord-organismer i et tidligere mine-område

- **Kontrol:** Forurenet, ikke oprenset område

- **Treatment:** Tidligere forurenet, nu oprenset område

- **Reference:** Naturligt upåvirket område

	Control area				Treatment area - grassland					Reference area - grassland				
	P1	P2	P4	P5	P1	P2	P3	P4	P5	P1	P2	P3	P4	P5
Metazoa_(Animalia)%	62,30%	32,85%	1,67%	8,60%	40,22%	62,91%	54,58%	75,62%	38,98%	78,51%	54,54%	46,28%	36,60%	45,27%
Tricladida	0,00%	0,00%	0,00%	0,00%	0,00%	0,08%	0,00%	0,00%	0,34%	0,00%	0,00%	0,00%	0,00%	0,00%
Continenticola	0,00%	0,00%	0,00%	0,00%	0,00%	0,08%	0,00%	0,00%	0,34%	0,00%	0,00%	0,00%	0,00%	0,00%
Rhabditophora	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	5,54%	0,02%	1,83%	0,00%	0,34%
Lecithoepitheliata	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	5,54%	0,02%	1,83%	0,00%	0,34%
Rhabdocoela	0,00%	0,00%	0,00%	0,00%	0,02%	0,10%	0,00%	0,00%	1,28%	0,42%	0,79%	0,15%	0,95%	2,15%
Dalyellioida	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,35%
Neodalyellida	0,00%	0,00%	0,00%	0,00%	0,02%	0,10%	0,00%	0,00%	1,28%	0,42%	0,79%	0,15%	0,95%	1,80%
Gastrotricha	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,29%	0,51%	0,06%	0,24%	1,03%
Chaetonotida	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,29%	0,51%	0,06%	0,24%	1,03%
Chromadorea	5,96%	6,09%	0,02%	6,43%	20,75%	13,07%	32,14%	39,81%	22,45%	43,41%	10,73%	8,70%	5,85%	10,41%
Araeolaimida	2,12%	0,00%	0,00%	2,78%	1,18%	1,27%	3,34%	2,23%	1,90%	0,57%	2,92%	1,83%	0,37%	0,36%
Chromadorida	0,00%	0,00%	0,00%	0,00%	0,07%	0,00%	0,00%	0,01%	0,00%	0,10%	0,17%	0,05%	0,06%	0,09%
Desmodorida	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,00%	0,03%	0,00%	0,00%	0,03%
Diplogasterida	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,00%	0,03%	0,31%	0,00%
Monhysterida	0,21%	0,16%	0,00%	0,03%	0,19%	0,12%	0,08%	0,08%	0,08%	0,05%	0,04%	0,02%	0,02%	0,13%
NA	0,00%	0,00%	0,00%	0,00%	0,00%	0,06%	0,00%	0,00%	0,21%	0,00%	0,00%	0,00%	0,00%	0,00%
Oxyurida	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Rhabditida	0,31%	0,46%	0,00%	0,52%	5,32%	6,13%	0,40%	0,00%	0,45%	1,46%	2,02%	0,52%	2,76%	1,36%
Tylenchida	3,31%	5,48%	0,02%	3,11%	13,99%	5,49%	28,32%	37,49%	19,80%	41,22%	5,55%	6,24%	2,34%	8,42%
Dorylaimia	1,04%	0,69%	0,00%	0,00%	1,14%	1,23%	0,65%	0,59%	0,26%	0,24%	0,58%	0,29%	0,43%	0,28%
Dorylaimida	1,04%	0,69%	0,00%	0,00%	1,14%	1,22%	0,65%	0,59%	0,26%	0,24%	0,58%	0,29%	0,43%	0,28%
Trichocephalida	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Enoplia	54,37%	25,72%	0,00%	0,00%	13,12%	47,82%	19,87%	30,34%	8,23%	10,51%	17,87%	17,59%	21,12%	10,90%
Enoplida	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,45%	3,21%	2,09%	2,38%	0,89%
NA	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,39%	0,00%	0,51%	2,46%	1,32%
Triplonchida	54,37%	25,72%	0,00%	0,00%	13,12%	47,82%	19,87%	30,34%	8,23%	9,66%	14,66%	14,99%	16,28%	8,70%
Catenulida	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,28%	0,14%	0,00%	0,06%
Catenulidae	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,14%	0,00%	0,06%
Stenostomidae	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,28%	0,00%	0,00%	0,00%
Eutardigrada	0,08%	0,00%	0,00%	0,00%	0,13%	0,01%	0,07%	0,09%	0,08%	0,06%	0,22%	0,09%	0,29%	0,20%
Parachela	0,08%	0,00%	0,00%	0,00%	0,13%	0,01%	0,07%	0,09%	0,08%	0,06%	0,22%	0,09%	0,29%	0,20%
Monogononta	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,00%	0,02%	0,00%	0,00%	0,00%
NA	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,00%	0,02%	0,00%	0,00%	0,00%
Ploimida	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Bdelloidea	0,18%	0,15%	0,23%	0,60%	0,10%	0,21%	0,02%	0,03%	0,05%	0,06%	0,24%	0,06%	0,05%	0,11%
Adinetida	0,10%	0,15%	0,23%	0,60%	0,09%	0,21%	0,02%	0,03%	0,05%	0,06%	0,16%	0,04%	0,05%	0,09%
NA	0,08%	0,00%	0,00%	0,00%	0,01%	0,00%	0,00%	0,00%	0,00%	0,00%	0,08%	0,02%	0,00%	0,02%
Annelida_Incertae_Sedis	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	2,18%	0,00%	0,00%	0,00%	12,02%
Hrabeiella	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	2,18%	0,00%	0,00%	0,00%	12,02%
Oligochaeta	0,00%	0,00%	0,00%	0,00%	3,59%	0,02%	1,35%	4,22%	5,53%	13,88%	21,02%	16,50%	7,44%	6,62%
Haplotaxida	0,00%	0,00%	0,00%	0,00%	3,59%	0,02%	1,35%	4,22%	5,53%	13,88%	21,02%	16,50%	7,44%	6,62%
Gastropoda	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,03%	0,00%	0,35%	0,01%	0,00%	0,01%	0,00%	0,01%
Heterobranchia	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,03%	0,00%	0,35%	0,01%	0,00%	0,01%	0,00%	0,01%
Arachnida	0,66%	0,02%	0,83%	0,76%	1,17%	0,25%	0,30%	0,45%	0,25%	1,86%	1,19%	0,76%	0,20%	0,58%
Acari	0,66%	0,02%	0,83%	0,76%	1,17%	0,25%	0,30%	0,45%	0,23%	1,86%	1,19%	0,76%	0,18%	0,58%
Araneae	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,02%	0,00%
NA	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,02%	0,00%	0,00%	0,00%	0,00%	0,00%
Chilopoda	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,00%	0,00%	0,02%	0,00%	0,24%	0,00%	0,00%	0,00%
Pleurostigmophora	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,00%	0,00%	0,02%	0,00%	0,24%	0,00%	0,00%	0,00%
Diplopoda	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Penicillata	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Copepoda	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Harpacticoida	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Ellipura	0,02%	0,01%	0,00%	0,03%	0,01%	0,00%	0,03%	0,03%	0,07%	0,03%	0,16%	0,00%	0,02%	0,03%
Collembola	0,02%	0,01%	0,00%	0,03%	0,01%	0,00%	0,03%	0,03%	0,07%	0,03%	0,16%	0,00%	0,02%	0,03%
Thysanura	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,65%	0,00%	0,00%	0,00%
Nicoletiidae	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,65%	0,00%	0,00%	0,00%
Neoptera	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Diptera	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Tetrapoda	0,01%	0,00%	0,03%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,00%
Mammalia	0,01%	0,00%	0,03%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,00%

Udvalgte jord-organismer til måling

	Control area				Treatment area - grassland					Reference area - grassland				
	P1	P2	P4	P5	P1	P2	P3	P4	P5	P1	P2	P3	P4	P5
Annelida_Incertae_Sedis	**0,00%**	**0,00%**	**0,00%**	**0,00%**	**0,00%**	**0,00%**	**0,00%**	**0,00%**	**0,00%**	**2,18%**	**0,00%**	**0,00%**	**0,00%**	**12,02%**
Hrabeiella	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*2,18%*	*0,00%*	*0,00%*	*0,00%*	*12,02%*
Oligochaeta	**0,00%**	**0,00%**	**0,00%**	**0,00%**	**3,59%**	**0,02%**	**1,35%**	**4,22%**	**5,53%**	**13,88%**	**21,02%**	**16,50%**	**7,44%**	**6,62%**
Haplotaxida	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*3,59%*	*0,02%*	*1,35%*	*4,22%*	*5,53%*	*13,88%*	*21,02%*	*16,50%*	*7,44%*	*6,62%*
Gastropoda	**0,00%**	**0,00%**	**0,00%**	**0,00%**	**0,00%**	**0,00%**	**0,03%**	**0,00%**	**0,35%**	**0,01%**	**0,00%**	**0,01%**	**0,00%**	**0,01%**
Heterobranchia	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,03%*	*0,00%*	*0,35%*	*0,01%*	*0,00%*	*0,01%*	*0,00%*	*0,01%*
Arachnida	**0,66%**	**0,02%**	**0,83%**	**0,76%**	**1,17%**	**0,25%**	**0,30%**	**0,45%**	**0,25%**	**1,86%**	**1,19%**	**0,76%**	**0,20%**	**0,58%**
Acari	*0,66%*	*0,02%*	*0,83%*	*0,76%*	*1,17%*	*0,25%*	*0,30%*	*0,45%*	*0,23%*	*1,86%*	*1,19%*	*0,76%*	*0,18%*	*0,58%*
Araneae	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,02%*	*0,00%*
NA	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,02%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*

Et antal slides er udeladt i den uploadede version grundet, at det er upubliseret videnskabeligt materiale:

Kontakt Peter Mortensen for yderligere informationer (dpm1@etn.eurofins.com)

Konklusioner

- **2025: EUs jordlov (SMRD) forventes vedtaget**
- **SMRD mål:** at beskytte jordens sundhed og resiliens, samt mennesker og miljø mod risici fra forurening, sikre fødevareproduktion, øge CE, reducere landindvinding mm.
- **Redskaber**: monitorering, grænseværdier sat i landene; EU overvågning, indikatorer
- **ARAGORN:** udvikling af målemetoder/planlægning/mapping/risikovurdering/ remediering/ restaurering/beslutningstagningsprocesser til at understøtte reguleringen
  - Udvikling af eDNA indikatorer for biodiversitet og arts antal.
  - Metabarcoding: et stærkt værktøj som vi kommer til at høre meget mere til fremover
- **Implementeringsfasen 2025-2027:** give input til tekniske vejledninger?
  - European Soil Observatory (EUSO): løbende information+ Cluster meetings https://join-research-centre.ec.europa.eu/eu-soil.observtory-euso_en
  - EUs Soil Mission week (Nov. 4-5 2025 på AU)
  - Potentiel lancering af jord-lov i Danmark (Dec. 2025)